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## **Executive Summary**

### **AN ELECTRONIC COMMERCE PROGRAM FOR THE DEFENSE FINANCE AND ACCOUNTING SERVICE - COLUMBUS CENTER**

The Defense Finance and Accounting Service - Columbus Center (DFAS-CO), one of six Department of Defense (DoD) finance centers, processes approximately 2.5 million documents annually. Projections indicate that by 1994 its workload will increase by more than 500 percent to 12.6 million documents and the size of its staff will more than double, from 1,200 to 2,700. The likelihood of even greater growth is high as DoD moves to further consolidate payment responsibilities at its finance centers.

In carrying out its payment responsibilities, DFAS-CO uses some Electronic Commerce techniques, such as electronic data interchange and electronic funds transfer. We believe additional applications of those techniques will enable DFAS-CO to replace many of its routine Contract Administration Services (CAS), Stock Fund, and Operations and Maintenance (O&M) business documents (such as contracts, invoices, acceptance notices, and checks) with electronic transactions. By doing so, we estimate that DFAS-CO will reduce the direct cost of its operations by more than \$61 million over the next 10 years, for a modest \$2.1 million investment. DoD activities that conduct business with DFAS-CO will need to invest an additional \$6.5 million, but their potential benefit from such an investment, although unquantified, is also substantial.

To guide DFAS-CO efforts in developing a comprehensive Electronic Commerce Program within its CAS, Stock Fund, and O&M payment areas, we provide detailed implementation plans and operating concepts for each area. We propose that DFAS-CO focus its initial efforts on expanding the use of electronic funds transfer, which should generate savings in excess of \$7 million within 5 years, growing to \$24 million over 10 years. Next, we propose that DFAS-CO expand its existing Electronic Commerce initiatives and launch new ones to receive invoices electronically. Those efforts should lead to savings of \$5 million over 5 years and \$16 million over 10 years. Finally, our plan calls for DFAS-CO establishing the

capability to receive contract information electronically. Although DFAS-CO may find this capability difficult to implement, the returns are significant – \$4 million over 5 years, escalating to \$16 million over 10 years.

We believe that DFAS-CO will face numerous challenges as it implements the Electronic Commerce Program outlined in this report. When completed, however, DFAS-CO will be conducting approximately three-fourths of its CAS, Stock Fund, and O&M business transactions electronically. It also will be in position to effectively satisfy future payment responsibilities with minimal personnel increases.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **BACKGROUND**

Electronic data interchange (EDI), the computer-to-computer exchange of standard business documents, has long been used by the private sector for processing purchase orders, shipping notices, receipts, invoices, payments, and a variety of other business documents. By exchanging information electronically, those businesses are able to reduce errors in data entry, eliminate mailing costs, decrease paper handling, reduce inventories, improve cash management, and shorten order times.

Although the Department of Defense (DoD) seeks those same benefits, its long-term goal is much broader and more encompassing. It would like to use EDI as a tool to fundamentally change its business practices, from paper-based document processing to a totally electronic environment. It calls that undertaking "Electronic Commerce through EDI."

The DoD's Electronic Commerce Program integrates EDI, electronic mail, electronic bulletin boards, electronic funds transfer (EFT), and similar techniques into a comprehensive, electronic-based system encompassing all of its business functions including procurement, contract administration, payment, supply management, transportation, maintenance, fuels management, and base operations. The program is not merely focused on automating existing manual processes, but also on enhancing the systems, capabilities, and procedures necessary for DoD Components to fundamentally alter the way they carry out their day-to-day operations.

Although not new to the DoD, the use of EDI received a major boost in May 1988 when then Deputy Secretary of Defense Taft directed DoD Components to make "... maximum use of electronic data interchange for the paperless processing of all business-related transactions. ..." He also charged the Assistant Secretary of Defense (Production and Logistics), ASD(P&L), with responsibility for establishing guidelines for "... acceptance of EDI as the normal way of doing business with DoD by the early 1990's."

In response to that charge, the ASD(P&L) designated the Defense Logistics Agency (DLA) as DoD's Executive Agent for EDI and Data Protection and directed that the Executive Agent provide the leadership required to implement Electronic Commerce throughout DoD.

One of the Executive Agent's first initiatives was to prepare a business case for Electronic Commerce.<sup>1</sup> That business case showed that over a 10-year period, DoD could achieve almost \$1.2 billion in direct and indirect cost savings by electronically processing 16 specific documents. Those documents include several that are traditionally targeted for EDI in the private sector – purchase orders, invoices, bills of lading, requests for quotations, and inspection reports.

The Executive Agent followed the business case with a strategic plan to serve as a blueprint for setting priorities for DoD investments in Electronic Commerce. A key element of that strategic plan is the development of a business plan for automating the receiving, processing, reconciling, and paying activities at the Defense Finance and Accounting Service – Columbus Center (DFAS-CO). This report presents that business plan.

## **ORGANIZATION OF REPORT**

Our report consists of five additional chapters. Chapter 2 provides an overview of DFAS-CO, including its organization, mission areas, workload, and automated systems. This overview sets the stage for determining the best prospects for using Electronic Commerce techniques to enhance routine business activities within each mission area. We present the results of that determination in Chapter 3.

In Chapter 4, we propose operating concepts for each of DFAS-CO's best EDI opportunities; we also discuss various technical issues associated with those opportunities.

Chapter 5 summarizes the economic benefits to DFAS-CO from implementing the EDI opportunities identified in Chapter 3 and expanded upon in Chapter 4. In developing those benefits, we estimate the potential cost savings for each opportunity and the investment costs required to achieve them.

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<sup>1</sup>LMI Report DL001-06R1, *A Business Case for Electronic Commerce*, Thomas P. Hardcastle and Thomas W. Heard, September 1990.



Chapter 6 concludes with our plan for implementing Electronic Commerce at DFAS-CO.

A series of appendices provide supporting details on DFAS-CO's trading partners, automated systems, potential cost savings, and estimated investment costs.

## **CHAPTER 2**

### **OVERVIEW OF DFAS-CO**

#### **INTRODUCTION**

This chapter provides a brief introduction to DFAS-CO operations, including its organizational structure, missions, key documents, projected growth, trading partners, and current and planned automated systems support. This material is fundamental to assessing if DFAS-CO's business practices are good candidates for EDI. That assessment is presented in the next chapter.

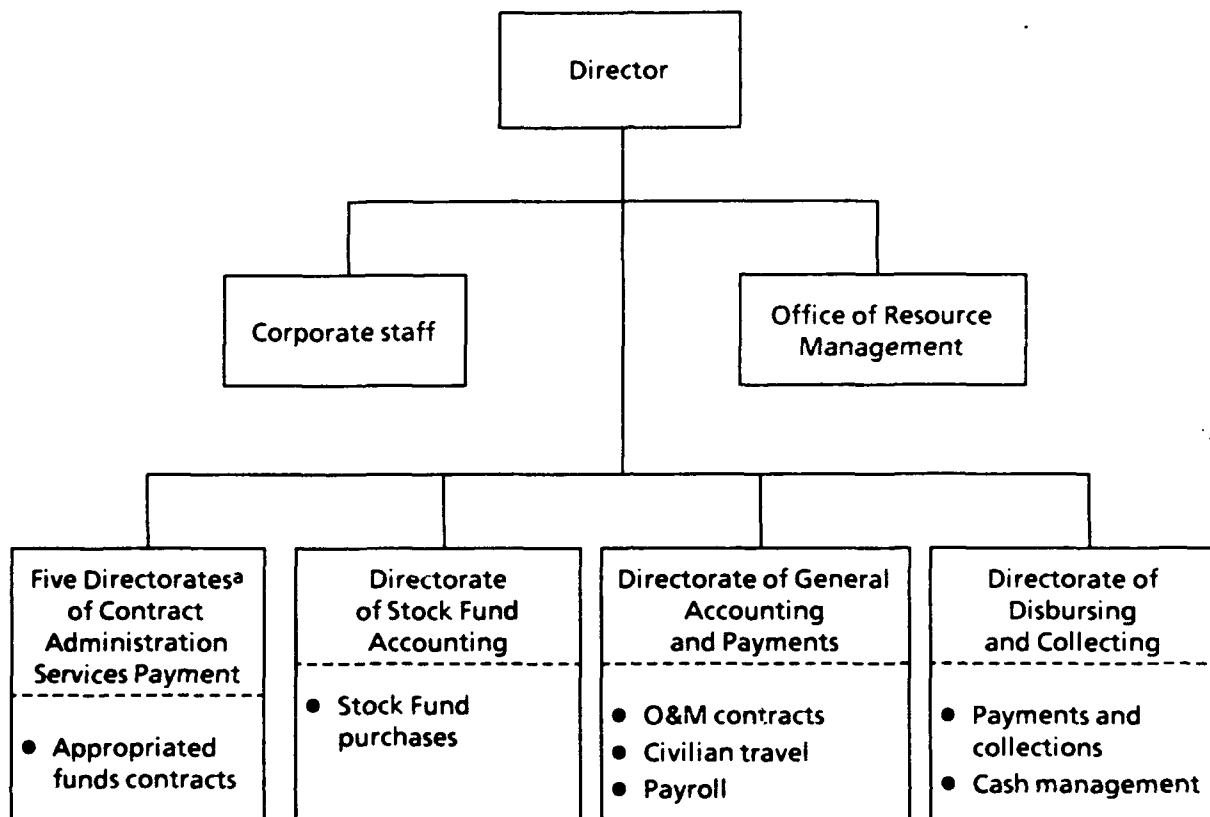
#### **ORGANIZATIONAL STRUCTURE AND MISSIONS**

Located in Columbus, Ohio, DFAS-CO is one of six major DoD finance centers. The others are DFAS-Indianapolis Center; DFAS-Cleveland Center; DFAS-Kansas City Center; DFAS-Denver Center; and DFAS-Washington Center.

The organization of DFAS-CO and corresponding mission areas are shown in Figure 2-1. A recent DLA decision to consolidate payment responsibilities at DFAS-CO already has had a significant impact on DFAS-CO's directorates and mission areas and will continue to have more of an impact over the next few years. We examine DFAS-CO's organization and mission areas in more detail below.

#### **Directorates of Contract Administration Services Payments**

The five Directorates of Contract Administration Services (CAS) Payments process appropriated fund contract payments and foreign military sales payments for the Military Services. Each directorate is undergoing a substantial change as a result of DLA's payment consolidation activities. Previously, nine Defense Contract Administration Services Regions (DCASRs) were responsible for both paying and administering contract payments. The nine DCASRs have recently been reorganized into five Defense Contract Management Districts (DCMDs): Mid-Atlantic (Boston); Northeast (Philadelphia); Southern (Atlanta); Central (Chicago); and Western (Los Angeles). The DCMDs now have the contract management, personnel, and quality



**Note:** O&M = Operations and Maintenance.

<sup>a</sup> Mid-Atlantic, Northeast, Southern, Central, and Western.

**FIG. 2-1. DFAS-CO ORGANIZATIONAL STRUCTURE AND MISSION AREAS**

assurance responsibilities formerly held by the DCASRs, while the CAS Payments Directorates have assumed the payment responsibilities.

The five CAS Payments Directorates, with a combined staff of 566 employees, are currently responsible for servicing 180,000 contracts. Three of the directorates are now operational (Northeast, Mid-Atlantic, and Western), with the other two (Central and Southern) scheduled to become operational within 1 year. The Western Directorate is the largest, with nearly 300 employees supporting 88,000 contracts; the others will average approximately 70 employees for every 25,000 contracts supported.

## **Directorate of Stock Fund Accounting**

The Directorate of Stock Fund Accounting, with 80 employees, pays (or will soon pay) for all Stock Fund purchases on behalf of DLA's supply centers and depots. As part of the payments consolidation process, it has assumed payment responsibility for Stock Fund purchases by the Defense Construction Supply Center (DCSC); it will assume similar responsibility for the four remaining DLA centers by FY93. The Directorate also provides billing services for DCSC's military customers, along with accounting and reporting services.

## **Directorate of General Accounting and Payments**

The Directorate of General Accounting and Payments, with 470 employees, has three DLA-wide mission responsibilities: Operations and Maintenance (O&M) payments, civilian payroll, and travel vouchers. Those responsibilities, formerly spread among DLA's depots, supply centers, and the DCMDs, are now being consolidated at DFAS-CO, with completion scheduled for late FY91. This directorate currently processes about 147,000 O&M invoices, 48,000 payroll accounts, and 84,000 travel vouchers annually.

## **Directorate of Disbursing and Collecting**

The Directorate of Disbursing and Collecting performs cash management functions for the CAS Payments and Stock Fund Directorates, including the preparation and issuance of checks. Its 120 employees issue more than 320,000 checks each year. Approximately 55 employees process checks and make EFT payments.

## **OPERATIONS**

### **Key Documents**

The DFAS-CO uses a variety of documents in carrying out its responsibilities. Table 2-1 lists several of them by major functional area (contracts, invoices, destination acceptance, travel, and payments) and shows the number processed each year. All, with the exception of commercial invoices, are standard documents used extensively throughout DoD. DFAS-CO processes more than 1.7 million of those documents annually, with invoices accounting for nearly 54 percent of the total.

**TABLE 2-1**  
**KEY DFAS-CO DOCUMENTS**

Functional area	Document	Title/description	Annual volume
Contracts	SF 26	Award/Contract	31,534
	DD Form 1155	Order for Supplies and Services	167,545
	SF 30	Amendment of Solicitation/ Contract Modification	112,025
Invoices	DD Form 250	Material Inspection and Receiving Report	300,088
	SF 1443	Contractor's Request for Progress Payment	9,280
	SF 1034	Public Voucher	171,516
	—	Commercial Invoice	453,809
Destination acceptance	DD Form 250	Material Inspection and Receiving Report	79,991
Travel	DD Form 1351	Travel Voucher	83,327
	DD Form 1131	Travel Collection	5,000
Payments	Payment (checks)	—	320,571
Total	—	—	1,734,686

**Note:** SF = Standard Form; DD = Defense Department. DD Form 250 has two separate applications: one as an invoice, another as an acceptance report.

## Growth

As a result of DLA's efforts to consolidate payment functions, DFAS-CO's workload is projected to increase substantially. Figure 2-2 shows that growth for three functional areas: contracts, invoices, and payments. DFAS-CO expects the number of contractual documents processed by the five CAS Payments Directorates to increase from the current annual volume of 180,000 to 460,000 (worth an estimated \$100 billion) by 1993. Even greater growth is projected for the number of invoices processed by the CAS Payments and Stock Fund Directorates — in excess of 400 percent.

The payments area is also expected to experience substantial growth in the near term. Part of this growth will be fueled by the increase in invoices; the consolidation of Defense Commissary Agent payment responsibilities at DFAS-CO, beginning on

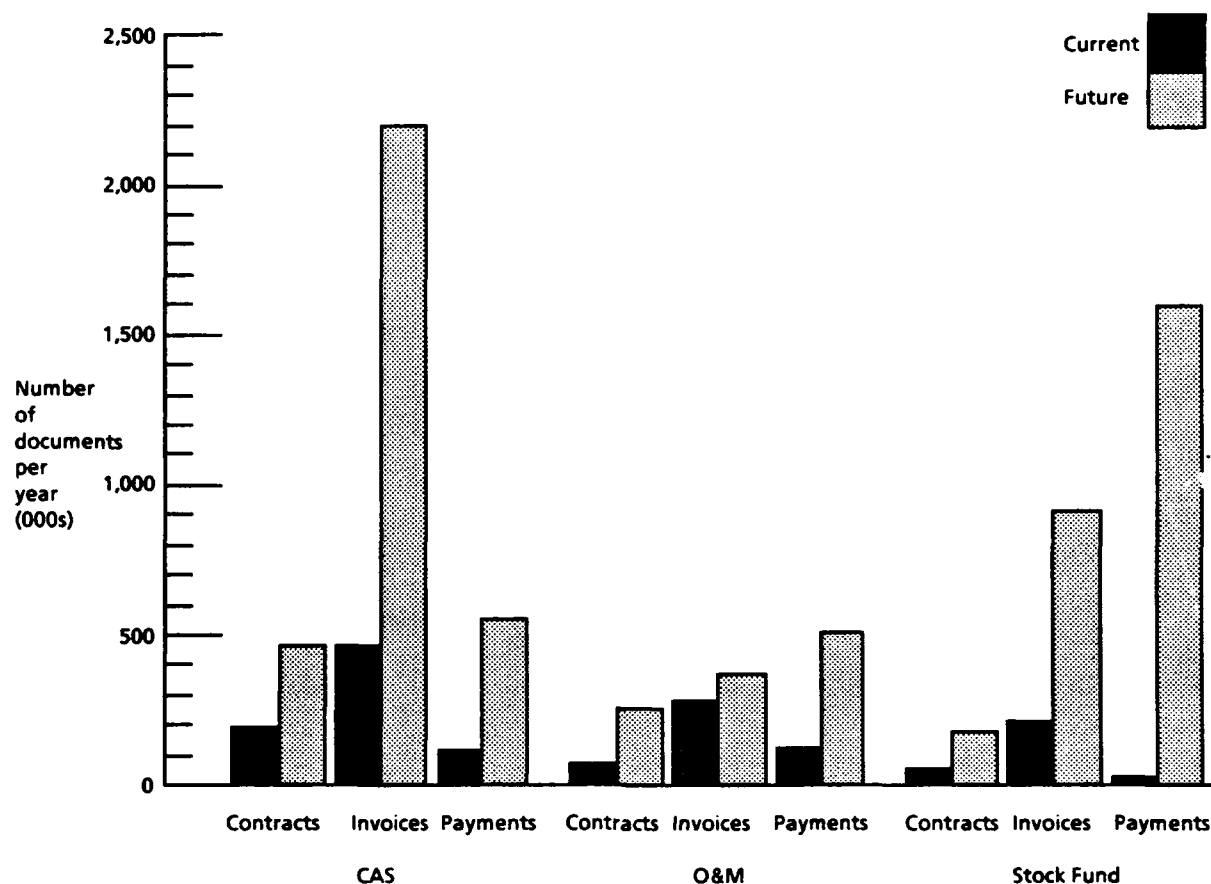


FIG. 2-2. CURRENT AND PROJECTED DFAS-CO WORKLOAD

1 October 1991, will also have a dramatic impact.<sup>1</sup> As a result of these and other changes, the number of checks issued by DFAS-CO will increase from the current level of 320,000 to approximately 2,650,250 annually – an 820 percent increase. In addition, the numbers of vendor invoice and payment status requests, generally made by telephone, are expected to increase by similar amounts. Altogether, DFAS-CO expects to process 8.1 million documents annually by 1994 (excluding status requests), a 400 percent increase over today's workload.

To handle the increased workload, DFAS-CO expects that its work force will nearly double from 1,200 to 2,700 within the next 2 to 3 years. Additional DFAS-CO growth is possible as a result of the January 1991 consolidation of DoD finance center

<sup>1</sup>Commissary responsibilities alone will increase annual Stock Fund payments by 1,476,000 and O&M payments by 324,000.

activities under a single umbrella organization, the Defense Finance and Accounting Service. In concert with this consolidation, the DoD Comptroller is now evaluating the allocation of selected DoD-wide finance functions, such as civilian pay, military pay, O&M payments, and industrial fund payments among the six DoD finance centers. That evaluation could result in the assignment of additional responsibilities to DFAS-CO.

### **Trading Partners**

In carrying out its payment responsibilities, DFAS-CO exchanges information with a large number of trading partners. Some of those are DoD activities (referred to as internal trading partners), while others are commercial vendors (or external trading partners).

Table 2-2 shows DFAS-CO's primary internal trading partners for CAS, Stock Fund, and O&M payments. (We exclude travel and payroll from the table because those trading partners consist of DLA employees, whose number varies significantly over time.) Clearly, the CAS Payments Directorate has the most internal trading partners – several hundred Military Service buying activities, 39 Defense Contract Management Area Operations (DCMAOs), and 47 Defense Plant Representative Offices (DPROs). Appendix A lists the major Military Service procurement activities in order of their volume (Table A-1); Table A-2 also identifies the 11 DCMAOs and 15 DPROs from the three DCMDs currently supported by the CAS Payments Directorates (Mid-Atlantic, Northeast, and Western).

Unlike the CAS payments area, the internal trading partners for Stock Fund and O&M payments consist primarily of a handful of DLA supply centers, depots, and DCMDs.

Table 2-3 shows some of DFAS-CO's external trading partners for the same three mission areas. For CAS payments, DFAS-CO receives invoices from hundreds of commercial trading partners, ranging from very large *Fortune 500* firms to small vendors. (Appendix A, Table A-3, provides additional details on DFAS-CO's external trading partners for CAS payments.) Although it has fewer external trading partners for Stock Fund purchases, DFAS-CO currently makes Stock Fund payments for DCSC only. The number of external trading partners in that area will increase significantly when the other supply centers transfer their payment functions to

**TABLE 2-2**  
**INTERNAL TRADING PARTNERS**

<b>CAS payments</b>	<b>Stock Fund payments</b>	<b>O&amp;M payments</b>
Military Service buying activities DCMDs DCMAOs DPROs Military Service accounting centers Funding stations DCAA DCMC	<p><b>Current</b></p> DCSC	<p><b>Current</b></p> DCAA DCMDs (Boston, New York, Atlanta, Chicago, Los Angeles) DFAS (all centers) DCSC DLA Administrative Support Center Defense Depot Mechanicsburg Defense Depot Memphis Defense Depot Tracy Defense Depot Columbus Defense Depot Richmond
	<p><b>Future<sup>a</sup></b></p> Defense General Supply Center Defense Electronic Supply Center Defense Industrial Supply Center Defense Personnel Support Center	<p><b>Future</b></p> Defense Depot Ogden, Utah Defense General Supply Center Defense Electronic Supply Center Defense Industrial Supply Center Defense Personnel Support Center

**Note:** DCAA = Defense Contract Audit Agency; DCMC = Defense Contract Management Command; DCMD = Defense Contract Management District.

<sup>a</sup> Supply depots could also be included in the future if procedures are changed to require follow-up directly with the depots to confirm receipt of material in the payment of contractor invoices. DFAS-CO also provides billing services for all military customers of the Defense Stock Fund.

**DFAS-CO.** The trading partner profile for O&M payments is similar to that for CAS payments.

## **AUTOMATION**

### **Payment Systems**

The DFAS-CO uses three primary computer systems to carry out its payment responsibilities.<sup>2</sup> The Mechanization of Contract Administration Services (MOCAS)

<sup>2</sup>All automated support is provided to DFAS-CO by the Information Processing Center – Columbus (IPCC).



**TABLE 2-3**  
**SELECTED EXTERNAL TRADING PARTNERS**

CAS payments		Stock Fund payments		O&M payments	
Trading partner	Annual invoices	Trading partner	Annual invoices	Trading partner	Annual invoices
Allied Signal	6,012	Wheeler Brothers	72,000	Federal Express	6,600
Hughes Aircraft	3,428	Alabama Value	12,600	Pitney Bowes	6,000
SAIC	3,144	Cummins Ohio	13,200	XEROX	3,900
Norden Systems	2,904	William & Watts	13,200	AT&T	3,900
Litton Systems	2,728	Laird Johnson	8,400	IBM	3,000
Westinghouse Electric	1,952	Holt-Refakis	8,400	Zenith	3,000
ITT Gilfillan	1,680	McMasters Car	7,200	PHH Home Equities	2,400
Gull Corporation	1,560	Gates Rubber	7,200	Storage Tech	1,200
Textron Lycoming	1,512	Sahara Diesel	6,000	Konica	1,200
FMC Corporation	1,372	Oshkosh Truck	4,800	Ricoh	900
Raytheon	1,188	Holt Brothers	4,350	NCR	600
ITT Corporation	1,124	Pioneer Valve	3,150	Falcon	150
Kearfott Guidance and Navigation	1,052	JGB Enterprises	2,400		
AMSTAR Corporation	1,044	Penn Enterprises	1,900		
Pride Products	980	Haynes Enterprises	950		
EDO Corporation	960	Appliances Parts	900		
Imperial Oil	872	New Lenox Lighting	300		
NAVCOM Defense Electronics	820	Aljeda Corporation	240		
CAL Western Packing Corp.	808	Telemechanics	240		
Lockheed Aeronautical Sys.	740				
Varian Associates	724				
<b>Subtotal</b>	<b>36,604</b>	<b>Subtotal</b>	<b>167,430</b>	<b>Subtotal</b>	<b>32,850</b>
<b>Total invoices</b>	<b>461,519</b>	<b>Total invoices</b>	<b>212,000</b>	<b>Total invoices</b>	<b>261,452</b>
<b>Percent of total</b>	<b>7.9</b>	<b>Percent of total</b>	<b>79</b>	<b>Percent of total</b>	<b>12.6</b>

**Note:** AT&T = American Telephone and Telegraph; ITT = International Telephone and Telegraph; NAVCOM = Naval Communications; IBM = International Business Machines; SAIC = Science Applications International Corporation.

system aids the CAS Payments Directorates in processing and paying contract invoices. The Standard Automated Material Management System (SAMMS) assists the Stock Fund Accounting Directorate in managing DLA's Stock Fund, processing and paying contract invoices, and performing numerous accounting functions. The Automated Payroll Cost and Personnel System (APCAPS) supports the General Accounting and Payments Directorate in paying DLA personnel. O&M payments are now made manually. Appendix B describes each of these systems in more detail.

### **Electronic Commerce Initiatives**

Electronic Commerce is not a new concept to DFAS-CO. It has a number of such initiatives either under way or planned. Some of those are described below.

#### ***Electronic Funds Transfer***

The DFAS-CO currently deposits approximately 80 percent of its payroll checks electronically into employee accounts. In contrast, it uses EFT for only 3 percent of its CAS payments and for 47 percent of its Stock Fund payments. These percentages (especially those for the CAS payments) are expected to increase significantly as more commercial vendors become familiar with the program. DFAS-CO uses the Cash Concentration and Disbursement (CCD+) and Corporate Trade Exchange (CTX) EFT standards in making those payments.

The DFAS-CO also uses EFT for travel advances and settlements. This capability is being phased in gradually on a site-by-site basis, beginning with DCMAO Memphis.

#### ***Electronic Procurement***

The SAMMS Procurement by Electronic Data Exchange (SPEDE) system electronically exchanges requests for quotations, quotations, purchase orders, and invoices between vendors and DLA supply centers. Developed by the DLA Systems Automation Center (DSAC), SPEDE is installed on IBM-compatible microcomputers at participating vendor sites.

At the end of every workday, SAMMS downloads between 800 and 1,200 purchase requests to SPEDE, which then determines the vendors involved in the transactions and transmits the day's purchase orders, requests for quotations, and award information to the appropriate vendors. When a vendor submits a quotation,

the DLA purchasing office provides, through SPEDE, either a purchase order or a notice of the vendor that received the award and at what price.

The DFAS-CO currently uses only the electronic invoicing capability of SPEDE. Approximately 57 percent of all Stock Fund invoices are now transmitted electronically through SPEDE, but expansion is limited by two major constraints:

- It lacks a robust communications network; all transactions are sent via modems and commercial telephone lines.
- It is not fully compatible with industry standards (X12) developed by the American National Standards Institute (ANSI), which may cause problems for vendors that already use those standards.

### ***Standardized Information Management***

The Logistics Information Exchange (LINX) is a DSAC-developed application system that is being tested at the Defense Personnel Support Center. Its objective is to provide a DLA-wide standard information management framework, including such capabilities as electronic mail, directory maintenance, and performance management. Developed in the Ada programming language to operate on DLA's Gould 9050 minicomputers, LINX uses Lawrence Livermore National Laboratory's intelligent gateway processor as a communications medium to route transactions between SAMMS sites and commercial vendors.

### ***Contract Administration***

The Military Standard Contract Administration Procedures, or MILSCAP, permit contractual data to be transmitted among various DoD contract administration and disbursing activities in a fixed-length record format. Under the first phase of DoD's Modernization of Defense Logistics Standard Systems (MODELS), MILSCAP transactions are being modified to conform to ANSI guidelines, including the conversion of MILSCAP data to a variable-length format.

### ***Modernization Projects***

A number of modernization projects, or "Little Victories," are under development at DFAS-CO. Three of those projects (image processing, invoice information, and reports download) have the potential to significantly enhance the implementation of Electronic Commerce at DFAS-CO.

### ***Image Processing***

With contractor assistance, IPCC has developed a prototype that uses either a scanner or facsimile machine to input vendor invoices (principally DD Form 250s) into MOCAS, which then selects some of the data elements for subsequent processing. The image processing system also stores images of the documents for later retrieval.

### ***Invoice Information***

The DSAC also has developed a system called COINS (Contractor Inquiry System) that allows vendors to use a microcomputer to dial into DFAS-CO to retrieve invoice status information. Although currently supporting only eight contractors, DFAS-CO plans to expand COINS to support more contractors and to enhance its capabilities.

### ***Reports Download***

The IPCC personnel recently developed a utility program, Reports Download, which sends reports from MOCAS and APCAPS (and soon SAMMS) into five minicomputers located at DFAS-CO. Those reports are used by DFAS-CO personnel to perform ad hoc searches and print out selected data, thereby eliminating the need to produce many standard MOCAS management reports.

## **SUMMARY**

The financial responsibilities of DFAS-CO are numerous, extensive, and growing. Its operations clearly are dominated by paper transactions (contracts, invoices, acceptance notices, and checks) with hundreds of internal (to DoD) and external (commercial) trading partners. It uses automated systems extensively in carrying out its payment responsibilities, although it currently lacks such a capability in the O&M payments area. It already has some capability to exchange business information electronically, such as electronic invoices through SPEDE and selected EFT applications. New initiatives, such as LINX and the modernization projects, will further enhance that capability.

## **CHAPTER 3**

### **EDI OPPORTUNITIES**

#### **INTRODUCTION**

This chapter builds upon the overview of DFAS-CO's operations presented in Chapter 2. In it, we assess the prospects of DFAS-CO expanding the use of Electronic Commerce techniques, particularly EDI and EFT, to carry out its payment responsibilities. Our assessment is based upon a set of criteria frequently used in the private and public sectors to evaluate EDI opportunities. We conclude the chapter by identifying the DFAS-CO mission areas that offer the best long-term prospects for EDI.

#### **EDI FEASIBILITY CRITERIA**

The first step in developing an Electronic Commerce business plan is to identify prospective EDI opportunities. Recent experience in the private and public sectors shows that the following four criteria are increasingly being used to determine whether a specific application is a suitable candidate for EDI:

- Volume
- Internal automation
- Business practices
- Trading partner capabilities.

Volume (i.e., the number of paper transactions) is regarded by many as the single most important criterion. That conclusion is based upon the simple assumption, confirmed in numerous studies, that electronic processing of business transactions is cheaper than paper processing. If true, then those EDI applications dealing with the most paper offer the greatest cost savings, all other things being equal.

In many business activities, however, volume is not static. Significant changes in the amount of paper processed by an organization can occur over time. Organizations without sufficient volume to justify EDI today may have it tomorrow. The

converse is also true. Therefore, volume and growth must be jointly considered when assessing the feasibility and practicality of EDI.

Those factors, however, are not the sole determinants of a favorable EDI opportunity. An organization must have the internal automation capability to receive and process EDI transactions. Without that capability, EDI is little more than a communications medium, which may lead to higher rather than lower processing costs.

Organizations must also look at the automation capabilities of their trading partners when assessing EDI opportunities. The EDI capability and expertise of trading partners are important if not critical. The nature of the business relationship with each trading partner (short term versus long term, frequency of transactions, etc.) is also important. Organizations cannot achieve the cost savings potential promised by EDI without long-term, stable relationships with EDI-capable trading partners.

Finally, the organization's specific business practices also need to be considered. For example, before making payment on an invoice, many organizations (including DFAS-CO) require a record of acceptance showing that delivery has occurred. If invoices are received electronically and acceptance information is received manually, the number of late payments could actually increase rather than decrease with EDI. Many organizations have found that they cannot make effective use of EDI without changing their existing internal business practices. We believe that DFAS-CO, if it elects to pursue additional EDI applications, also will need to change some of its business practices.

## **OPPORTUNITY ANALYSIS**

In this section, we apply the EDI feasibility criteria to each of DFAS-CO's mission areas – CAS payments, Stock Fund payments, O&M payments, travel vouchers, and civilian payroll – to determine which mission areas, if any, have the potential to make full use of EDI techniques.

### **CAS Payments**

Three of the principal documents within this mission area (contracts, invoices, and payments) are excellent EDI candidates. In addition, invoice and payment status requests, now handled by telephone, present another favorable opportunity.

DFAS-CO processes enough CAS contracts and invoices to justify investing in EDI; those volumes are also expected to increase dramatically in the near future. Although the CAS Payments Directorates already make extensive use of automation, significant program changes to MOCAS will likely be required to enable them to take full advantage of EDI.

The trading partner profile for CAS payments is also conducive to EDI. While the CAS Payments Directorates have a wide variety of internal trading partners, 31 buying activities account for more than 80 percent of the total CAS payments contract volume, and 5 of the largest are DLA activities. (By comparison, the top 150 shippers in Defense transportation account for 80 percent of DoD's shipment volume.)<sup>1</sup> Additionally, most of the external trading partners for CAS invoices are large *Fortune 500* firms, many of which have sophisticated automation systems and extensive EDI experience. Further, the business relationships between DFAS-CO and its external trading partners tend to be long term and stable.

One factor that may slow the rate of EDI implementation, however, is the large number of CAS external trading partners. Before DFAS-CO can achieve a 70 percent implementation rate for electronic invoicing, it will require participation by an estimated 350 CAS commercial vendors. DFAS-CO will be challenged to get that many vendors to participate in its EDI program.

One document – destination acceptance – presents a potential stumbling block to a full implementation of EDI in the CAS payments area. (Approximately 13 percent of CAS invoices currently require receipt of destination acceptance before an invoice can be paid.) If destination acceptance is not received within 30 days of the receipt of a vendor's invoice, then DFAS-CO violates the Prompt Payment Act and interest charges begin to accrue. Implementing EDI for invoices requiring destination acceptance causes the payment "clock" to begin earlier, with the potential for greater interest payments. Although DFAS-CO uses a system called the Destination Acceptance Reporting and Tracking System to electronically transmit, via MILSCAP, follow-up notices between 10 and 14 days after a destination acceptance is due, those documents frequently arrive late at DFAS-CO. In addition, even if EDI could speed the transmission of destination acceptance to DFAS-CO,

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<sup>1</sup>LMI Report AL711R1, *An Electronic Future for Defense Transportation Management*, Thomas W. Heard and W. Michael Bridges, 1990.

implementing that capability at hundreds of receiving activities presents a formidable challenge.

The remaining CAS invoices (87 percent) require source acceptance, which means that they can be paid after a DCMAO or DPRO notifies DFAS-CO that the goods have been inspected, accepted, and shipped. That notification is already sent electronically, generally in advance of the invoice.

### **Stock Fund Payments**

The Stock Fund mission area already uses EDI extensively through SPEDE, but additional applications in the invoice, invoice/payment status requests, and payment areas have considerable promise.

When contract and destination acceptance information are entered at DCSC, the same information automatically becomes available to SAMMS users at DFAS-CO through the Active Contracts File. That capability will be expanded when the other supply centers (which also use SAMMS) transfer their payment responsibilities to DFAS-CO. While late destination acceptance notices are still a problem, the small number of internal trading partners and the Active Contracts File minimize delays caused by lack of destination acceptance information. As a result, DFAS-CO does not need to make any further EDI investment in this area, with the possible exception of expanding SPEDE's communications capabilities.

The situation is quite different for the invoice, status request, and payment areas. The volumes of those documents are currently large and are expected to grow even larger in the next few years. Further, the Stock Fund Directorate currently has only one internal trading partner, DCSC, and plans to add only four more – the other DLA supply centers. Although a relatively small number of external trading partners (19) generate almost 80 percent of all Stock Fund invoices at the current time (shown in Table 2-3), we expect the profile of those external trading partners to change dramatically as the other supply centers are added. The directorate also has an extensive EDI capability (i.e., SPEDE) that it can build upon as it expands its EDI efforts.

One unanswered question regarding this mission area is the length of time that DLA will use SAMMS to process Stock Fund purchases. The recent DoD Corporate Information Management (CIM) plan for materiel management and distribution



recommends that the Navy's Procurement Early Development (PED) system, combined with features of the DLA Pre-Award Contracting System (DPACS) and the Air Force's Contracting Data Management System (CDMS), become the DoD-wide interim standard system for materiel management procurement. This system will ultimately replace SAMMS as well as similar systems currently used by the Military Services.<sup>2</sup>

### **O&M Payments**

For many of the same reasons cited in the CAS and Stock Fund payment areas, the O&M mission area within the General Accounting and Payments Directorate also is a good EDI candidate. It has the necessary volume, growth pattern, and trading partner characteristics to justify implementation of EDI. The O&M mission area, however, has one serious drawback: it has no internal automation.

The DFAS-CO is currently discussing the possibility of using the redesigned Standard Army Financial System (SRD-1) to help automate O&M payments. If SRD-1 is found to be feasible, then DFAS-CO may require up to 1 year to implement it. Destination acceptance also may be a problem for O&M, although only 8 percent of O&M invoices currently require such documentation prior to payment.

### **Travel Vouchers and Civilian Payroll**

The travel vouchers and civilian payroll mission areas (both the responsibility of the General Accounting and Payments Directorate) do not have the stable, long-term trading partner relationships required for effective EDI. However, both are excellent candidates for EFT. The Directorate of Disbursing and Collecting already uses EFT for 80 percent of its civilian payroll transactions and has plans to expand EFT to cover CAS and Stock Fund payments as well; it also is phasing-in EFT for travel reimbursements. The expansion of EFT into these areas represents another significant Electronic Commerce opportunity.

### **SUMMARY**

In this chapter, we use several criteria to assess the EDI potential of specific business practices in DFAS-CO's five primary mission areas - CAS, Stock Fund,

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<sup>2</sup>*Materiel Management and Distribution Interim Systems and Executive Agent Selection Report*, DoD Materiel Management Board, November 1990, p. 2-3.

O&M, travel vouchers, and civilian payroll. Our assessment shows that many of the paper documents processed in the CAS and Stock Fund payment mission areas are excellent EDI candidates. Both areas process a large and increasing number of documents; they have a manageable number of trading partners, most of whom are EDI capable; and they have the automated systems needed to support EDI transactions. O&M payments will be another strong candidate for EDI when it possesses the appropriate internal automation capability. The travel vouchers and civilian payroll areas, while excellent EFT opportunities, are not good EDI candidates because of the variety and instability of their trading-partner relationships. All five mission areas are excellent candidates for expanded EFT applications.

These EDI opportunities will be enhanced by several Electronic Commerce initiatives currently under way or planned by DFAS-CO. Two initiatives – SPEDE and LINX – will figure prominently in the EDI implementation plans presented in Chapter 6. Others, particularly COINS and image processing, could help expand DFAS-CO's trading partner base.

In the next chapter, we propose specific operating concepts for each opportunity.

## **CHAPTER 4**

### **EDI OPERATING CONCEPTS**

#### **INTRODUCTION**

In the preceding chapter, we identified three primary mission areas that offer promising EDI opportunities for DFAS-CO: CAS payments, Stock Fund payments, and O&M payments. In this chapter, we propose specific EDI operating concepts for each opportunity.

Our proposed EDI operating concepts consist of two parts. The first addresses the information flows (in terms of existing document categories such as invoices, contracts, etc.) and associated EDI transaction sets that would be exchanged by DFAS-CO and its trading partners. Although the information flows are similar within the three mission areas, they still warrant separate consideration. The second part considers the technical configuration (*hardware, software, and communications*) required to accommodate EDI transactions among DFAS-CO and its trading partners. Unlike the information flows, we anticipate that a single technical configuration can support all three mission areas.

#### **EDI INFORMATION FLOWS**

##### **CAS Payments**

Figure 4-1 shows the proposed EDI information flow for CAS payments. Although the figure appears to be quite complex, it merely defines the electronic communications among DFAS-CO and its key trading partners (contract management activities, buying activities, vendors, and receivers), and the ANSI standards (or transaction sets) already used by both the public and private sectors to exchange such information electronically. Table 4-1 describes the ANSI and EFT standards required to implement this operating concept. It also identifies the DFAS-CO documents replaced by each standard. (As will be seen shortly, we propose that these same standards be used in the EDI information flows for Stock Fund and O&M payments.)

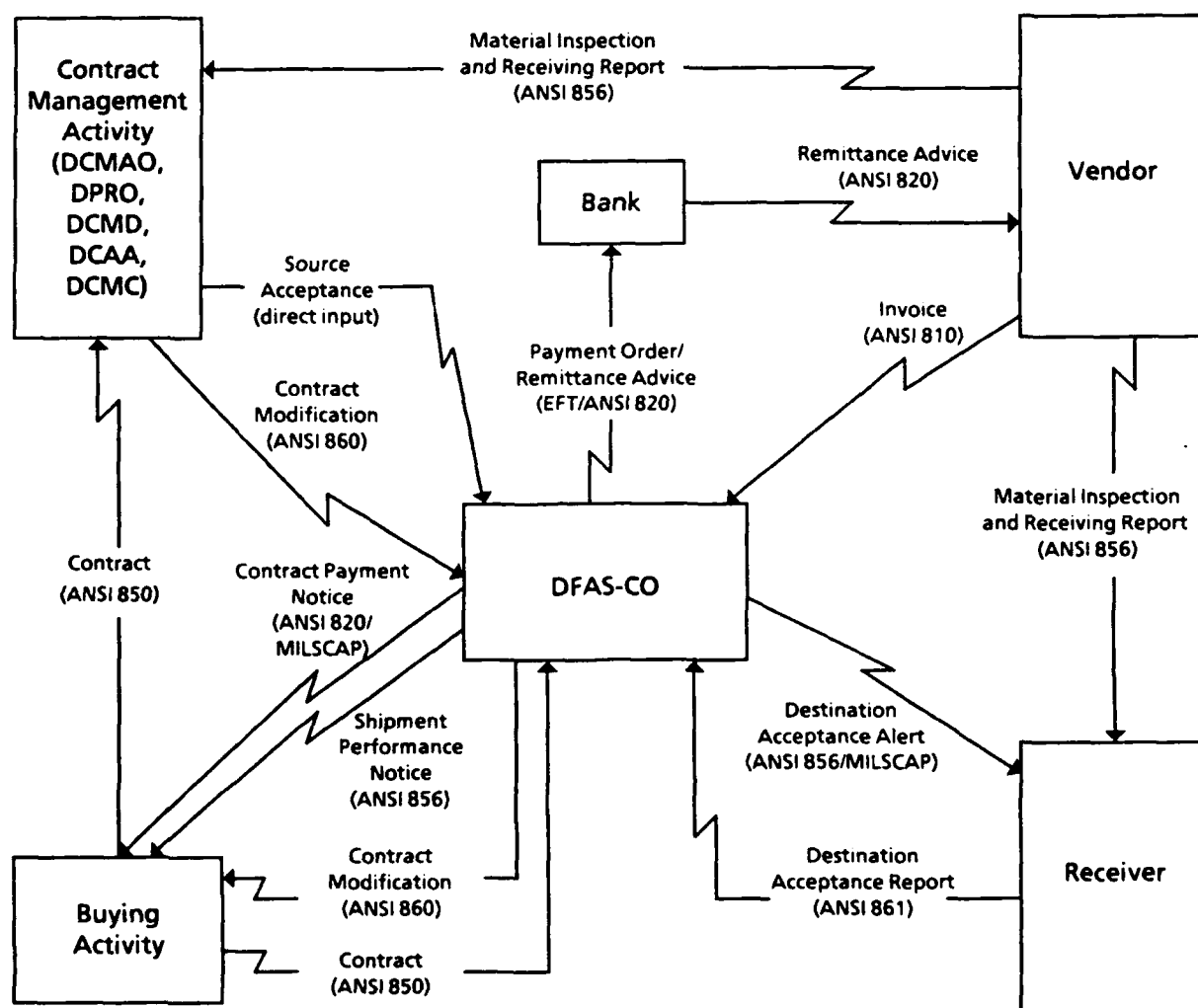


FIG. 4-1. EDI INFORMATION FLOW: CAS PAYMENTS

As noted in Figure 4-1 and Table 4-1, ANSI standards exist for each of the documents used in the CAS payments area. Nonetheless, DFAS-CO may still need to modify those standards to accommodate its unique data requirements.

The EDI transmissions among DFAS-CO and its trading partners, as illustrated in Figure 4-1, are described below:

- **Source Acceptance.** Contract Management Activities, most of which are DLA activities, currently send source acceptance information electronically to DFAS-CO through direct input of DD Form 250 data. This practice would not change.

TABLE 4-1

## EDI TRANSACTION SETS REQUIRED BY DFAS-CO

Standard	Title	Functional application	Document
810	Invoice	Invoice, progress payment	DD Form 250, SF 1443, SF 1034, commercial invoice a
820	Payment Order/Remittance Advice	Payment/invoice status Postpayment remittance advice/contract payment notice	
850	Purchase Order	Contract	SF 26, DD Form 1155
856	Shipment Notice/Manifest	Destination acceptance alert	DD Form 250
860	Purchase Order Change	Contract modification	SF 30
861	Receiving Advice	Destination acceptance report	DD Form 250
CCD +	Cash Concentration and Disbursement	Payment	Check
CTX	Corporate Trade Exchange	Payment	Check

a Payment/invoice status is currently handled by telephone; postpayment remittance advice is the check stub.

- **Contract.** Purchasing offices within the Military Service buying activities would send contract information to DFAS-CO and to the appropriate contract management activity using the ANSI 850 transaction set. Contract modifications would be sent to DFAS-CO using the ANSI 860 transaction set.
- **Invoice.** Vendors would provide invoice information to DFAS-CO using the ANSI 810 transaction set.
- **Material Inspection and Receiving Report.** Vendors would send shipment notices to DoD receivers and/or the contract management activity using the ANSI 856 transaction set. The shipment notice would be entered into MOCAS by the contract management activity, thus making that information available to DFAS-CO.
- **Payments/Remittance Advice/Payment Notice.** DFAS-CO would provide electronic payment (using either the CCD+ or CTX standards) and remittance advice (using the ANSI 820 transaction set) to vendor banks. DFAS-CO would also send a contract payment notice (either through

MILSCAP, as done now, or using the ANSI 820 transaction set) to the buying activity's contract accounting office.

- *Destination Acceptance Alert/Destination Acceptance Report.* After a shipment notice (Material Inspection and Receiving Report) is entered into MOCAS by the contract management activity, DFAS-CO would send a Destination Acceptance Alert to the receiving activity using either the ANSI 856 transaction set or a MILSCAP format. Following receipt of a shipment, the receiving activity would send a Destination Acceptance Report, using the ANSI 861 transaction set, to DFAS-CO.

### Stock Fund Payments

Figure 4-2 presents the proposed EDI information flow for Stock Fund payments. Following the same format as Figure 4-1, it shows the flow of documents among DFAS-CO and its trading partners and the ANSI standards that are used for exchanging such information.

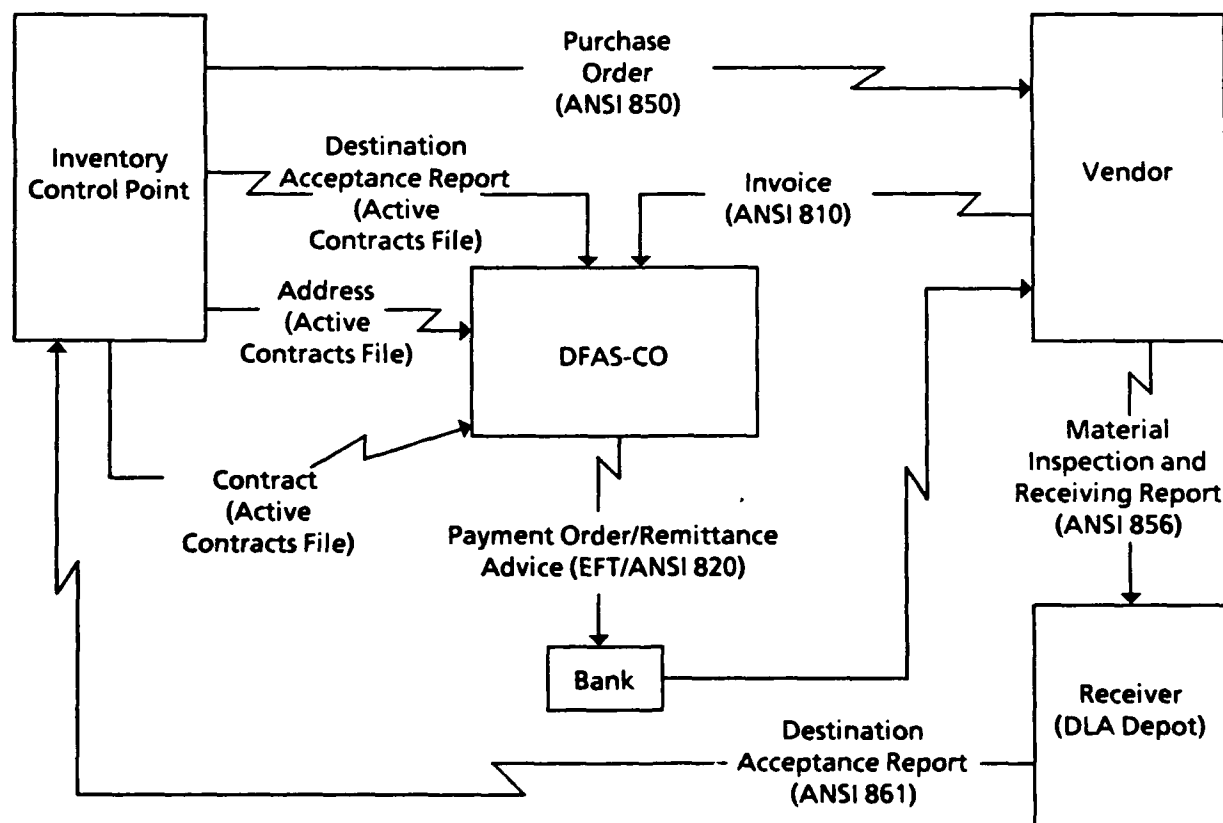


FIG. 4-2. EDI INFORMATION FLOW: STOCK FUND PAYMENTS

The CAS and Stock Fund payments mission areas exchange much of the same type of information (and consequently use the same ANSI standards), but several important differences exist. First, the six DLA depots, rather than a large number of installations and activities, send Stock Fund destination acceptance information to DFAS-CO. Second, Stock Fund contract and destination acceptance information are transmitted to DFAS-CO via the Active Contracts File, so a separate EDI transaction is not required. Finally, unlike CAS with its numerous external trading partners, four vendors – Wheeler Brothers, Alabama Valve, Cummins, and William & Watts – currently generate more than 52 percent of all Stock-Fund invoices sent to DFAS-CO. However, since DFAS-CO does not now pay for all DLA Stock Fund purchases, the dominance of these vendors may change as DFAS-CO's responsibilities in this area grow.

### **O&M Payments**

The proposed EDI information flow in the O&M payments mission area, as presented in Figure 4-3, is similar to that in the CAS payments area with a few exceptions. First, the buying activities are DLA activities (principally supply centers and depots), a small subset of the CAS procurement offices. Second, management of O&M contracts is not delegated to a central activity (such as a DCMD in the CAS payments area). Finally, O&M invoices are often sent to DFAS-CO through a contracting officer's representative (COR); in the CAS payments area, invoices are sent directly from the vendor to DFAS-CO.

The O&M payments information flow calls for the same six EDI transaction sets used for CAS payments and either the CCD+ or CTX formats for EFT payments. Those similarities should make implementation of EDI in this area relatively easy, particularly if DFAS-CO implements EDI in the CAS payments mission area first.

### **TECHNICAL CONFIGURATION**

Figure 4-4 provides an overview of a technical configuration (i.e., hardware, software, and communications linkages) supporting implementation of our proposed information flows. It assumes that all external and most internal trading partners would transact their business with DFAS-CO using a commercial value-added network (VAN). That VAN would store all DFAS-CO transactions for subsequent access by the EDI host in Columbus. The host would contain both the EDI translation software (to properly format incoming data) and other gateway functions

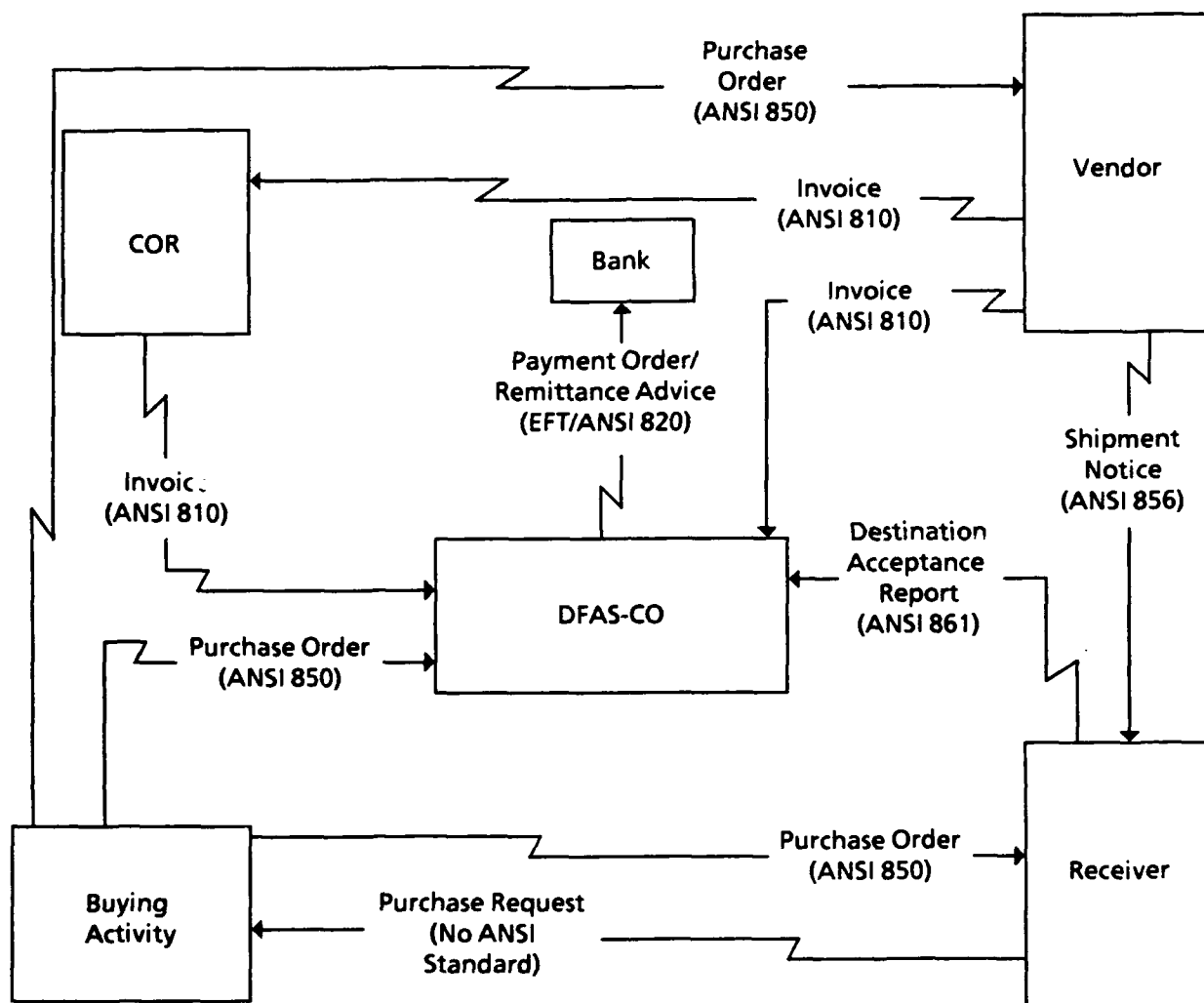


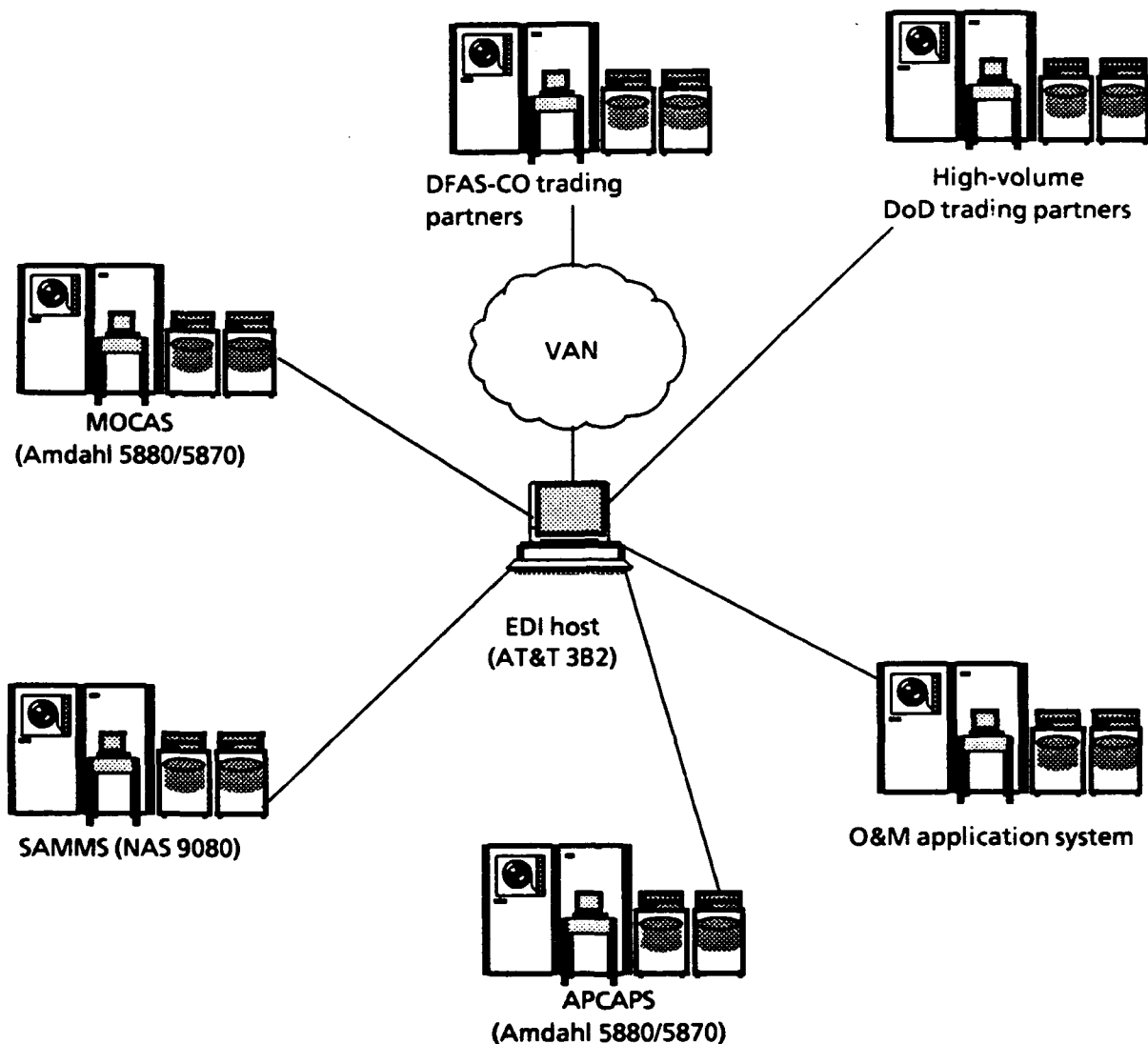
FIG. 4-3. EDI INFORMATION FLOW: O&M PAYMENTS

(such as LINX) to route transactions to and from the proper DFAS-CO applications system.

Since a few high-volume internal DoD trading partners may find it economically advantageous to communicate directly with the EDI host without going through a VAN, we show a separate direct connection between those trading partners and the host.

Two aspects of the technical configuration (the VAN and the EDI host) are discussed in more detail below.





**Note:** NAS = Network Application Support.

**FIG. 4-4. EDI TECHNICAL CONFIGURATION FOR DFAS-CO**

### **Value-Added Network**

Although DFAS-CO could establish a direct communications link with its external trading partners using modems and commercial telephone lines (as in SPEDE), we believe that the use of a commercial VAN would be a better alternative because it provides a number of services that simplify EDI communications. Those services include document handling and distribution (electronic mailboxing), protocol and speed conversion, network interconnectivity, data backup, and customer

support. Without a VAN, DFAS-CO would need to negotiate individually with numerous vendors to establish compatible communications protocols, schedule daily information transfers, and arrange back-up procedures if electronic communications fail. From a practical point of view, such an arrangement would be an operational nightmare.

For many of these same reasons, DFAS-CO also should use VANs for exchanging information with its internal DoD trading partners, which, as described in the information flows, would ultimately number in the hundreds.

Currently, Defense transportation is preparing a request for proposals for a commercial VAN to support its EDI program. While that procurement action has a dollar ceiling, DFAS-CO may be able to use those VAN services until DoD purchases additional commercial VAN services or builds its own communications capability.

## **EDI Host**

The EDI host, a dedicated AT&T 3B2 minicomputer, will form the central core of DFAS-CO's EDI system. That host will contain two major components: gateway software and EDI translation software. These components are described in more detail below.

### **Gateway Software**

The EDI Executive Agent and its lead engineering activity (Lawrence Livermore National Laboratory) are developing and testing a standard EDI technical architecture for DoD. That architecture will likely employ techniques that allow incoming EDI transactions (such as invoices) to automatically and transparently be routed to the proper DFAS-CO application system (MOCAS, SAMMS, APCAPS, and the future O&M system). LINX is also being developed to provide a standard DLA information management framework and a set of utilities (electronic mail, directory maintenance, and performance management) to support existing and emerging DLA initiatives.

To help us estimate EDI investment costs for DFAS-CO (presented in the next chapter), we assume that LINX would serve as the interface between DFAS-CO's applications systems and the EDI translation software. Since LINX incorporates intelligent gateway processor technology, it can automatically route incoming EDI transactions to the appropriate DFAS-CO applications system without requiring the

sender to specify that system. The various LINX utilities also could be of value to the proposed EDI information flows, although some of the LINX utilities may duplicate those available through a commercial VAN.

### ***EDI Translation Software***

EDI translation software enables DFAS-CO to communicate with all of its trading partners in a standard EDI format without changing internal applications. That software is readily available in the commercial marketplace for virtually all major computer hardware and operating systems.<sup>1</sup> We expect that this software would reside on a dedicated AT&T 3B2 minicomputer along with either the LINX system and/or other gateway software developed by the Executive Agent and the lead engineer. DSAC has purchased a copy of the American Business Computer translation software package for testing purposes; it operates on both the Gould 9050 and the AT&T 3B2 and costs about \$15,000.

### **SUMMARY**

This chapter presents operating concepts for three of the most promising EDI opportunities at DFAS-CO. The operating concepts consist of information flows and a technical configuration, drawing extensively upon existing DFAS-CO capabilities, to support those flows. In the next chapter, we examine the economic implications that DFAS-CO can expect if it implements these operating concepts.

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<sup>1</sup>For more information on EDI translation software, see LMI Report No. PL005R1, *A Guide to EDI Translation Software*, Harold L. Frohman, 1991 Edition.

## **CHAPTER 5**

### **ECONOMIC ANALYSIS**

This chapter presents our estimates of the economic consequences if DFAS-CO implements EDI in the opportunity areas identified in Chapter 3. We first discuss the expected direct cost savings and then address the investment costs required to achieve those savings. We conclude with suggestions on which EDI opportunities DFAS-CO should pursue first. Further details on our procedures for calculating the cost savings and investment costs can be found in Appendices C and D.

#### **COST SAVINGS**

Although the implementation of our proposed EDI operating concepts should result in significant cost savings to DFAS-CO and both its internal and external trading partners, we address only DFAS-CO's cost savings in this chapter. The associated savings to DFAS-CO's internal trading partners will be the subject of a separate report.

We believe that *DFAS-CO* could save more than \$61 million in current dollars over a 10-year period (the expected project life cycle) by implementing EDI in three mission areas: CAS, Stock Fund, and O&M payments. Table 5-1 shows the projected direct cost savings for each mission area by year through FY01. We estimate that almost one-half of the savings, \$29.2 million, will occur in the CAS payments area. The total annual savings are expected to grow rapidly from \$0.3 million in FY92 to more than \$8.7 million by FY99, provided the growth projections noted in Chapter 2 remain valid.

Table 5-2 breaks out the life-cycle direct cost savings by specific functional area. Invoices and contracts, when lumped together, account for nearly one-half of the DFAS-CO savings. Payments account for an additional 38 percent of the total, primarily because of the expected tenfold increase in the number of payments

resulting from DFAS-CO's assumption of commissary payment responsibilities beginning on 1 October 1991.<sup>1</sup>

**TABLE 5-1**  
**PROJECTED DFAS-CO DIRECT COST SAVINGS FROM EDI**  
**(\$000)**

Mission area	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	Total
CAS	42	647	2,205	3,181	3,616	3,824	3,905	3,918	3,918	3,918	29,174
Stock Fund	273	560	884	1,561	2,289	2,751	3,016	3,066	3,066	3,066	20,532
O&M	0	159	433	1,008	1,428	1,625	1,727	1,730	1,730	1,730	11,570
Total	315	1,366	3,522	5,750	7,333	8,200	8,648	8,714	8,714	8,714	61,276

**TABLE 5-2**  
**PROJECTED DFAS-CO DIRECT COST SAVINGS BY FUNCTIONAL AREA**  
**(\$000)**

Functional area	Life-cycle direct cost savings			
	CAS	Stock Fund	O&M	Total
Contracts	9,675	0	4,594	14,269
Invoices	11,100	3,645	1,517	16,262
Payments	4,985	14,660	4,626	24,271
Status requests	2,748	2,227	768	5,743
Destination acceptances	666	0	65	731
Total	29,174	20,532	11,570	61,276

Table 5-3 shows DFAS-CO's projected workload expressed in terms of the number of documents processed by each mission area over the project life cycle. Counting each status request as a separate document, we estimate that the number of documents processed by DFAS-CO will increase from approximately 2.5 million in

<sup>1</sup>Total DFAS-CO payments (excluding travel) will increase from 248,752 in FY91 to 2,650,250 by FY94. See Table C-5 in Appendix C for further details.

FY91 to almost 12.7 million in FY94 — a 508 percent increase.<sup>2</sup> During the 10-year project life cycle, DFAS-CO is expected to process more than 119 million documents.

**TABLE 5-3**  
**EXPECTED DFAS-CO WORKLOAD VOLUME**  
(Number of documents in 000s)

Mission area	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	Total
CAS	2,746	4,217	5,687	5,687	5,687	5,687	5,687	5,687	5,687	5,687	52,459
Stock Fund	3,993	4,526	5,059	5,059	5,059	5,059	5,059	5,059	5,059	5,059	48,991
O&M	1,553	1,709	1,867	1,867	1,867	1,867	1,867	1,867	1,867	1,867	18,198
Total	8,292	10,452	12,613	12,613	12,613	12,613	12,613	12,613	12,613	12,613	119,648

In estimating these cost savings, we follow the methodology described in our business case for Electronic Commerce. However, we deviate from that methodology in three ways:

- We do not include indirect cost savings in our DFAS-CO savings figures; the \$61 million represent direct cost savings only. Nevertheless, we believe that DFAS-CO could also realize significant indirect cost benefits from EDI, particularly in the areas of reduced interest costs, increased use of discounts, and improved prepayment auditing.
- We modify the direct cost savings for three contractual documents (SF 26, SF 30, and DD Form 1155) based upon data provided by DFAS-CO.
- For some documents, we tailor the 10-year EDI implementation rates used in the business case to fit DFAS-CO's situation. For example, we lower the implementation rates for the first 3 years, pending development of an automated O&M system. Also, we place a ceiling on all invoice implementation rates at 70 percent because of the large number of trading partners involved.<sup>3</sup> Finally, because of the large number of receiving

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<sup>2</sup>Vendor invoice and payment status requests are currently processed by telephone. We assume that these requests would be replaced with EDI transactions. Appendix C provides additional detail on the savings calculations for invoice and payment status transactions.

<sup>3</sup>For example, we estimate that participation by at least 350 commercial vendors will be required in the CAS payments area to reach a 70 percent implementation rate for invoices. The Stock Fund and O&M external trading partner profiles are similar.

activities involved, we lower the maximum implementation rate for destination acceptance documents to 40 percent.

## **INVESTMENT COSTS**

To achieve the \$61 million in direct cost savings, DFAS-CO and its DoD trading partners will need to invest approximately \$8.7 million (see Table 5-4). (We assume that DoD will not absorb any commercial vendor investment costs.)

### **DFAS-CO Investments**

Table 5-4 shows that DFAS-CO will need to invest approximately \$2.1 million to implement EDI in the three mission areas.<sup>4</sup> The components of that investment are described in more detail in the following subsections.

#### **Hardware**

Drawing upon the technical configuration presented in Chapter 4, we assume that DFAS-CO will use a front-end minicomputer to host the EDI translation software and to serve as the EDI host. Although this alternative is slightly more expensive than using either a front-end microcomputer or mainframe host (see Appendix D), DSAC and DFAS-CO personnel prefer it because they can procure minicomputer hardware from existing contracts.

We further assume that an AT&T 3B2 minicomputer, at a fully loaded price (including extra optical disk storage) of approximately \$75,000, will be the EDI host. We estimate that all three mission areas, combined, will generate a maximum of 36,000 transactions per day, well within the capacity of this hardware configuration.

#### **Software**

The DSAC representatives believe that the American Business Corporation is the only commercial vendor that has an EDI translation software package for the AT&T 3B2. DFAS-CO will require one package at a total cost of \$15,000.

#### **Communications**

The DFAS-CO will require approximately \$3,000 to install a dedicated line between its EDI host and a commercial VAN. DFAS-CO also will incur annual

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<sup>4</sup>The \$2.1 million investment will likely be split among DFAS-CO, IPCC, and DSAC.

**TABLE 5-4**  
**ESTIMATED EDI INVESTMENT COSTS**

Requirement	Investment (\$000)		
	DFAS-CO	DoD	Total
Hardware	75	1,380	1,455
Software	15	690	705
Communications <sup>a</sup>	3	138	141
System integration			
• Interface programming	126	462	588
• Application systems enhancements	1,365	2,508	3,873
Program management			
• Promote and coordinate	84	297	381
• Internal operating procedures	54	612	666
• Trading partner development	84	–	84
Implementation support			
• Planning and coordination	75	275	350
• Standards development	75	–	75
• Implementation guideline development	75	–	75
• Training	12	184	196
• Trading partner expansion	75	–	75
<b>Total</b>	<b>2,118</b>	<b>6,546</b>	<b>8,664</b>

<sup>a</sup> Set-up costs only.

transaction-based communication costs. These and other recurring costs are examined in a separate section below.

### ***Systems Integration***

To implement EDI, DFAS-CO will need to undertake two types of integration activities: interface programming and applications systems enhancements.<sup>5</sup> Interface programming formats data from the EDI translator into flat-file records for processing by the DFAS-CO applications systems. DSAC is currently developing the

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<sup>5</sup>We assume that DFAS-CO will use in-house resources to perform both system integration activities.



LINX system, at a cost of \$126,000 [5½ GS-12 (General Schedule) Systems Analysts for 6 months], for this purpose. We use this figure for cost estimating purposes.

The DFAS-CO's applications systems must be modified to use EDI information. Such enhancements will permit DFAS-CO to take advantage of the indirect benefits offered by EDI. (Although we do not include any indirect cost savings in Table 5-1, we discuss such savings in Appendix C.) Those enhancements include developing a prepayment auditing capability, modifying late payment and discount calculations, and improving management reports.

Using SPEDE software development as a guide, we estimate that enhancements to DFAS-CO's three applications systems (MOCAS, SAMMS, and the future O&M system) will require approximately \$1.4 million (60,000 hours or 30 man-years of effort), nearly two-thirds of the total DFAS-CO investment. This figure assumes that enhancements will be made to *existing* applications systems and that none of those systems will require a major overhaul. If this assumption does not hold, then the required investment could be much higher.

### ***Program Management***

Although program management represents a relatively small proportion of the total DFAS-CO investment (only 10 percent), it is a critical function. It includes promoting and coordinating EDI activities among the various program participants (both DoD and commercial), revising operating procedures and developing new ones to govern EDI transactions, and establishing and nurturing trading-partner relationships and agreements. We assume that DFAS-CO will require almost 5 man-years of staff effort, spread over a 2- to 3-year timeframe, to provide the required management of the EDI program.

### ***Implementation Support***

We believe that many of these activities (especially development of implementation guidelines and training) can be most efficiently accomplished by private-sector organizations that specialize in EDI. We therefore assume for costing purposes that DFAS-CO will use contractor support to carry out the five major implementation support activities.

The first, planning and coordination, addresses all the activities required to finalize and carry out the implementation plan detailed in Chapter 6. They include

establishing the project team and developing a project management plan for achieving the various implementation tasks. We estimate that DFAS-CO will require approximately 1,000 hours of contract support, at a cost of \$75,000, for this activity.

The second activity involves standards development. As noted in Chapter 4, DFAS-CO's three EDI operating concepts call for the use of six ANSI standards: 810 (Invoice); 820 (Payment Order/Remittance Advice); 850 (Purchase Order); 856 (Shipment Notice/Manifest); 860 (Purchase Order Change); and 861 (Receiving Advice). DFAS-CO will need to work with ANSI standards committees to incorporate any modifications of these standards that are required to meet its data requirements. We assume that each ANSI standard will require approximately 1 man-month of contractor support, at a total cost of \$75,000.

The third activity, implementation guidelines, entails the mapping of specific DFAS-CO data elements on to the appropriate ANSI transaction sets. DFAS-CO should accomplish this activity at the same time it modifies the existing ANSI standards. We assume that this activity will require a level of contractor support comparable to the standards development activity, or \$75,000. For the fourth activity, employee training, we assume that DFAS-CO will elect to train four employees from each mission area, at a cost of approximately \$1,000 per person if the training is provided by a commercial firm specializing in EDI.

The fifth implementation activity involves expanding the number of DFAS-CO's trading partners. We expect that this activity will continue over several years, with the first 2 years requiring the most effort. We again estimate that DFAS-CO will require 1,000 hours of contractor support, at a total cost of \$75,000.

### ***Recurring Costs***

Unlike the one-time investment costs examined above, some EDI operating costs will recur on an annual basis. The cost savings resulting from the elimination of many recurring costs, such as data input, document storage, and postage, are accounted for in our cost-reduction methodology. Two categories of recurring costs – communications and software maintenance – deserve separate attention, since they will increase with EDI.

We estimate that DFAS-CO's communications costs will be approximately \$26,000 in FY92, ultimately increasing to \$473,000 (in current dollars) by FY98 when EDI transactions reach their peak (see Appendix D). (By comparison, we estimate that DFAS-CO's mailing costs would exceed \$768,000, also in current dollars, in FY98 without EDI.) As mentioned above, we have already subtracted these costs in our direct cost savings calculations.

Translation software maintenance costs will also increase under EDI. We estimate that DFAS-CO will pay an additional \$4,000 per year to maintain its translation software when EDI is implemented. These costs have not been subtracted from our cost savings calculations.

### **DoD Investments**

Table 5-4 shows that DoD activities – DFAS-CO's internal trading partners – will need to make the bulk of the investment before EDI can become a reality at DFAS-CO. The investment required by those trading partners, principally Military Service buying activities, totals approximately \$6.5 million, or approximately three times that of DFAS-CO.

In developing this estimate, we assume an EDI operating environment that consists of 31 internal trading partners for CAS payments and 15 for O&M payments, the number required to achieve an 80 percent implementation rate for contract documents. (Table A-1 in Appendix A identifies those CAS trading partners; Table 2-2 lists the O&M trading partners.) In addition, we estimate that the 31 CAS activities currently support 17 unique systems, while the 15 O&M activities use only 4 systems. Further, as a result of the CIM efforts, the 17 CAS systems will eventually be replaced by 4 unique procurement systems, and the 4 O&M systems will be reduced to 2.<sup>6</sup> As a consequence, central design agencies for those unique systems will need to undertake a number of activities (such as interface programming, applications systems enhancements, promotion, and planning) only once and then export the finished products to the other activities.

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<sup>6</sup>For costing purposes, we assume that eight systems in the CAS payments area and three systems in the O&M area will be operating when DFAS-CO implements its EDI production system.

Since SAMMS already receives contract information electronically through the Active Contracts File, the Stock Fund area requires little or no additional DoD investment.

We use the same assumptions for computing DoD's investment costs as we did for estimating DFAS-CO's. We assume that DoD activities will, like DFAS-CO, use a minicomputer to host EDI translation software. However, since DFAS-CO will absorb the costs of trading partner development, EDI standards, and implementation guidelines, DoD activities do not need to undertake these tasks a second time.

We also assume that DoD activities will require a lower level of effort to enhance their applications systems – 10,000 hours per system, about 50 percent of the DFAS-CO amount. We believe that the lower number is justified for two reasons. For one, DFAS-CO systems will require greater enhancements because of the large volume of incoming and outgoing transactions. The second reason is that many of the DoD activities already have a data base of contract information, which can be readily transmitted electronically to DFAS-CO.

#### **IMPLEMENTATION PRIORITIES**

Tables 5-1 and 5-2 clearly show that DFAS-CO's primary benefits from EDI will occur through the replacement of just a few documents (invoices, contracts, payments, status requests, and destination acceptances) with their electronic equivalents. Since it is impractical for DFAS-CO to pursue implementation of all documents concurrently, we suggest the following priorities:

- Payments (using EFT)
- CAS and Stock Fund invoices
- CAS contracts
- CAS and Stock Fund status requests; CAS destination acceptances
- O&M invoices
- O&M contracts
- O&M status requests and destination acceptances.

We single out EFT payments and CAS/Stock Fund invoices for early implementation because they are the easiest to implement – industry standards exist and

are widely used, and DFAS-CO's vendors should be willing participants because of the prospects for timely and accurate payments. (Since the CAS and Stock Fund areas use the same invoice documents, we suggest they be implemented in parallel.) We list the CAS contracts next because they are quite complex and probably will require some modifications to the ANSI standards to accommodate DFAS-CO's requirements. Further, contracts are processed by numerous DoD activities, all of which need to be EDI capable.

We show the O&M documents last because that mission area currently lacks an internal automation capability.

## **SUMMARY**

We estimate that with a DoD-wide investment of approximately \$8.7 million, DFAS-CO will reap direct savings in excess of \$61 million over a 10-year period by implementing EDI in three mission areas: CAS, Stock Fund, and O&M payments. Those savings exclude any indirect benefits that may accrue to DFAS-CO as a result of replacing its paper-based business practices with electronic transactions. They also exclude all benefits from EDI at other DoD activities, DFAS-CO's internal trading partners. Both the indirect benefits from EDI and the benefits at other DoD activities could be substantial — perhaps three to four times DFAS-CO's cost savings.

In the next chapter, we present a detailed plan for implementing EDI at DFAS-CO.

## **CHAPTER 6**

### **IMPLEMENTATION STRATEGY**

This chapter lists the tasks that typically apply to an EDI implementation effort and describes how each task relates to DFAS-CO. It also presents schedules for implementing EDI within DFAS-CO's key mission areas: CAS, Stock Fund, and O&M payments. The tasks and schedules jointly provide DFAS-CO with an implementation strategy for automating its invoice, contract, status request, destination acceptance, and payment responsibilities.

#### **IMPLEMENTATION PLAN**

Table 6-1 summarizes the tasks that typically are associated with implementing a comprehensive EDI program such as we advocate for DFAS-CO. The numbers by the subheads in this section correspond to those in the implementation plan in Table 6-1.

#### **1.0 Review and Complete Strategic Plan**

The first steps in implementing an EDI program are to establish project teams for coordinating related efforts, establish priorities for those teams, and review and complete the implementation plans.

##### ***1.1 Establish EDI Project Team***

In this subtask, DFAS-CO, in conjunction with IPCC and DSAC, would establish an EDI project team for each mission area. Each team should be comprised of systems and communications representatives, and functional managers. Chaired by a DFAS-CO manager, each project team should be responsible for implementing the remaining tasks in this plan.

##### ***1.2 Review and Complete Implementation Plan***

In this subtask, the project team would review and complete DFAS-CO's EDI implementation plan.

**TABLE 6-1**  
**IMPLEMENTATION PLAN**

- 1.0 Review and complete strategic plan**
  - 1.1 Establish EDI project team**
  - 1.2 Review and complete implementation plan**
- 2.0 Identify functional requirements**
  - 2.1 Detail and complete operating concepts**
  - 2.2 Identify and resolve business, legal, and security issues**
  - 2.3 Develop data requirements**
  - 2.4 Identify applications systems modifications**
- 3.0 Identify physical requirements**
  - 3.1 Review and complete hardware specifications**
  - 3.2 Identify EDI translation software requirements**
  - 3.3 Establish telecommunications requirements and strategy**
  - 3.4 Identify other requirements**
- 4.0 Develop EDI standards and conventions**
  - 4.1 Map data requirements to commercial standards**
  - 4.2 Develop or modify commercial standards**
  - 4.3 Publish implementation guidelines**
- 5.0 Integrate and test system**
  - 5.1 Procure and install hardware and EDI software**
  - 5.2 Modify applications systems**
  - 5.3 Develop interface programs**
  - 5.4 Arrange for telecommunications**
  - 5.5 Update operating procedures**
  - 5.6 Train operators**
  - 5.7 Test, evaluate, and modify system**
- 6.0 Establish trading partner relationships**
  - 6.1 Develop trading partner implementation strategy**
  - 6.2 Develop and distribute trading partner information packages**
  - 6.3 Solicit trading partners**
- 7.0 Implement production system**

## **2.0 Identify Functional Requirements**

In this task, the project team would identify operational, business, legal, security, data, and technical issues that affect DFAS-CO's efforts to establish an electronic operating environment.

### ***2.1 Detail and Complete Operating Concepts***

In this subtask, the project team would develop a document that describes the data flows, trading partners, work methods, and procedures that DFAS-CO plans to use in an electronic environment. The purpose of this document is to ensure that DFAS-CO personnel have a clear understanding of the new work methods, procedures, and control systems.

### ***2.2 Identify and Resolve Business, Legal, and Security Issues***

In this subtask, the project team would investigate DFAS-CO's internal operating procedures, legal requirements, systems security, and audit capabilities to ensure that the integrity of those functions is maintained in an electronic environment. The project team would resolve any problems identified.

### ***2.3 Develop Data Requirements***

In this subtask, the project team, working with mission-area managers, would identify the data requirements needed to accomplish the data flows described in the EDI operating concepts completed in Subtask 2.1. Those data requirements would be used to develop EDI standards in later tasks.

### ***2.4 Identify Applications Systems Modifications***

The operating concepts document should highlight the need for enhancing DFAS-CO's applications systems to take full advantage of electronic information. In this subtask, the project team would identify and develop a plan for implementing those enhancements.

## **3.0 Identify Physical Requirements**

After determining the functional requirements, the project team would identify DFAS-CO's EDI hardware, software, facility, and manpower requirements.



### **3.1 Review and Complete Hardware Specifications**

In this subtask, the project team would assess system-throughput requirements to determine DFAS-CO's hardware specifications. (As noted in Chapter 4, we assume that DFAS-CO will choose an AT&T 3B2 minicomputer to host the EDI gateway and translation software.)

### **3.2 Identify EDI Translation Software Requirements**

In this subtask, the project team would identify DFAS-CO's EDI software requirements. Some of those requirements include translation of internal fixed records to and from ANSI standards, unattended communications with the host applications systems, and compatibility with commercial VANs. A complete list of translation software requirements is found in LMI's *A Guide to EDI Translation Software*, 1991 Edition.<sup>1</sup>

### **3.3 Establish Telecommunications Requirements and Strategy**

In this subtask, the project team would develop a strategy to allow DFAS-CO to exchange business information electronically with its internal and external trading partners. Before this strategy is completed, the project team must determine EDI telecommunications requirements (i.e., the number of transactions between DFAS-CO and its key internal and external trading partners). As discussed in Chapter 5, we propose that a commercial VAN be used for most EDI transactions between DFAS-CO and its trading partners. However, other telecommunications solutions (such as direct links with large-volume trading partners) also may be examined.

### **3.4 Identify Other Requirements**

In this subtask, the project team would ensure that DFAS-CO's facilities (telephone lines, electrical outlets, and office space) can support an electronic operating environment. The project team also would assess DFAS-CO's personnel capabilities to assure the availability of appropriate skills to use the full capabilities of EDI.

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<sup>1</sup>LMI Report PL005R1, *A Guide to EDI Translation Software*, Harold L. Frohman, 1991 Edition.

## **4.0 Develop EDI Standards and Conventions**

Following the identification of DFAS-CO's data requirements, the project team would turn its attention to ensuring that existing ANSI standards can accommodate DFAS-CO's requirements.

### ***4.1 Map Data Requirements to Commercial Standards***

In this subtask, the project team would match the data requirements from each mission area with a specific location in the applicable ANSI standard. Deficiencies in existing standards would be identified during this process and remedied in Subtask 4.2.

### ***4.2 Develop or Modify Commercial Standards***

In this subtask, which builds upon the results of Subtask 4.1, the project team would work with the ANSI X12 subcommittees to either develop new EDI standards or modify existing ones.

### ***4.3 Publish Implementation Guidelines***

In this subtask, the project team would publish the completed ANSI standards and the rules for their use in a set of implementation guidelines documents. Those documents should be developed using DoD's automated system for publishing implementation guidelines in a standard format.

## **5.0 Integrate and Test System**

In this task, the project team would field the EDI system at DFAS-CO, establish telecommunications, develop detailed operating procedures, train operators, test the system, and make any necessary system modifications.

### ***5.1 Procure and Install Hardware and EDI Software***

In this subtask, DFAS-CO would procure the hardware and EDI software specified in Subtasks 3.1 and 3.2. Because of the long lead-times associated with these types of procurement efforts, DFAS-CO should explore the feasibility of using existing contracts (such as for the AT&T 3B2).

## ***5.2 Modify Applications Systems***

In this subtask, the project team would enhance DFAS-CO's applications systems (MOCAS, SAMMS, and the future O&M system). Some functions – input screens, data bases, and reports – may require significant modification. Others, such as prepayment auditing, need to be added. These enhancements should be coordinated with redesign efforts, either under way or planned, for DFAS-CO's applications systems.

## ***5.3 Develop Interface Programs***

In this subtask, the project team would work with the EDI translation software vendor to define the formats for passing data between DFAS-CO's applications systems and the EDI translator. Programmers, following the implementation guidelines developed in Subtask 4.3, would extract selected data elements from the applications systems for transfer to and from the translator.

## ***5.4 Arrange for Telecommunications***

In this subtask, the project team would implement the telecommunications strategy developed in Subtask 3.3, to include accessing commercial EDI VANs, establishing mailboxes on those VANs, developing file transfer routines with the EDI host, and working with trading partners on communications passwords and codes.

## ***5.5 Update Operating Procedures***

In this subtask, the project team, building upon the operating concept document developed in Subtask 2.1, would formulate detailed operating procedures and schedules for day-to-day EDI operations including software operation, transmission scheduling, customer service, back-up routines, and business procedures. The project team also would review all internal procedures developed for a manual processing environment to determine how they would be satisfied in an EDI environment.

## ***5.6 Train Operators***

In this subtask, the project team would formulate and oversee the use of a comprehensive EDI training program, to include internal operating procedures and translation software operation.

### ***5.7 Test, Evaluate, and Modify System***

In this subtask, the project team would test the EDI system using sample data, evaluate the results, and make appropriate modifications. The project team would next test the system using real data sent by a small group of trading partners through the telecommunications network. This test should be conducted in parallel with existing paper flows. Each component of the entire system – telecommunications, translation software, gateway/host processing, interface programs, and applications systems – should be evaluated and modified, as appropriate. This process should be repeated until the system passes all pre-established testing criteria.

## **6.0 Establish Trading Partner Relationships**

In this task, the project team would formulate a strategy for soliciting trading partners. It includes development of a trading partner information package and procedures for encouraging and expediting trading partner participation.

### ***6.1 Develop Trading Partner Implementation Strategy***

In this subtask, the project team would develop a strategy for establishing EDI capabilities with DFAS-CO's major trading partners. That strategy should address the implementation pace, milestones, procedures, and requirements for both internal and external trading partners.

### ***6.2 Develop and Distribute Trading Partner Information Packages***

In this subtask, the project team would develop a document that provides all pertinent EDI information for prospective DFAS-CO trading partners including implementation procedures, DFAS-CO operating concepts, EDI passwords and codes, points of contact, and EDI trading partner agreements. This package also should include the implementation guidelines developed in Subtask 4.3.

### ***6.3 Solicit Trading Partners***

In this subtask, the project team would use the products of Subtasks 6.1 and 6.2 in soliciting DFAS-CO trading partners to participate in its EDI efforts.

## **7.0 Implement Production System**

Once testing has been completed and DFAS-CO's trading partners are prepared to receive and send business information electronically, then DFAS-CO's EDI system should be used in a production environment. DFAS-CO should focus initially on increasing the number of its trading partners by an average of 10 each month. Progress may be slower than that at first but should increase rapidly as standard trading partner agreements are created. As the trading partner base expands, DFAS-CO should explore additional business opportunities and add other trading partners that were not initially targeted.

### **IMPLEMENTATION SCHEDULES**

In this section, we propose schedules for implementing EDI in each of DFAS-CO's key mission areas: CAS, Stock Fund, and O&M payments. We further subdivide implementation activities for each mission area into four functional categories: invoices, contracts, status requests, and destination acceptances.

Because of the unique supportive role that Disbursing and Collecting has in each of these areas (i.e., the payment function), we treat it as a separate mission area for implementation purposes. However, because DFAS-CO already has an active EFT production system in place, Disbursing and Collecting requires very little preparatory work compared to the other mission areas. Therefore, its implementation can begin almost immediately. By contrast, CAS and Stock Fund EDI production systems will require between 18 to 24 months of preparation, while O&M will require 24 to 36 months.

#### **CAS Payments**

Figure 6-1 shows a 24-month schedule for implementing EDI in the CAS payments area. Initial operating capability for the receipt of vendor invoices is scheduled for February 1993.

#### **Stock Fund Payments**

Although CAS and Stock Fund implementation efforts should proceed concurrently, we separate their implementation schedules because the latter already has an EDI invoicing program through SPEDE and receives contract and destination acceptance information from the SAMMS Active Contracts File. We show the Stock

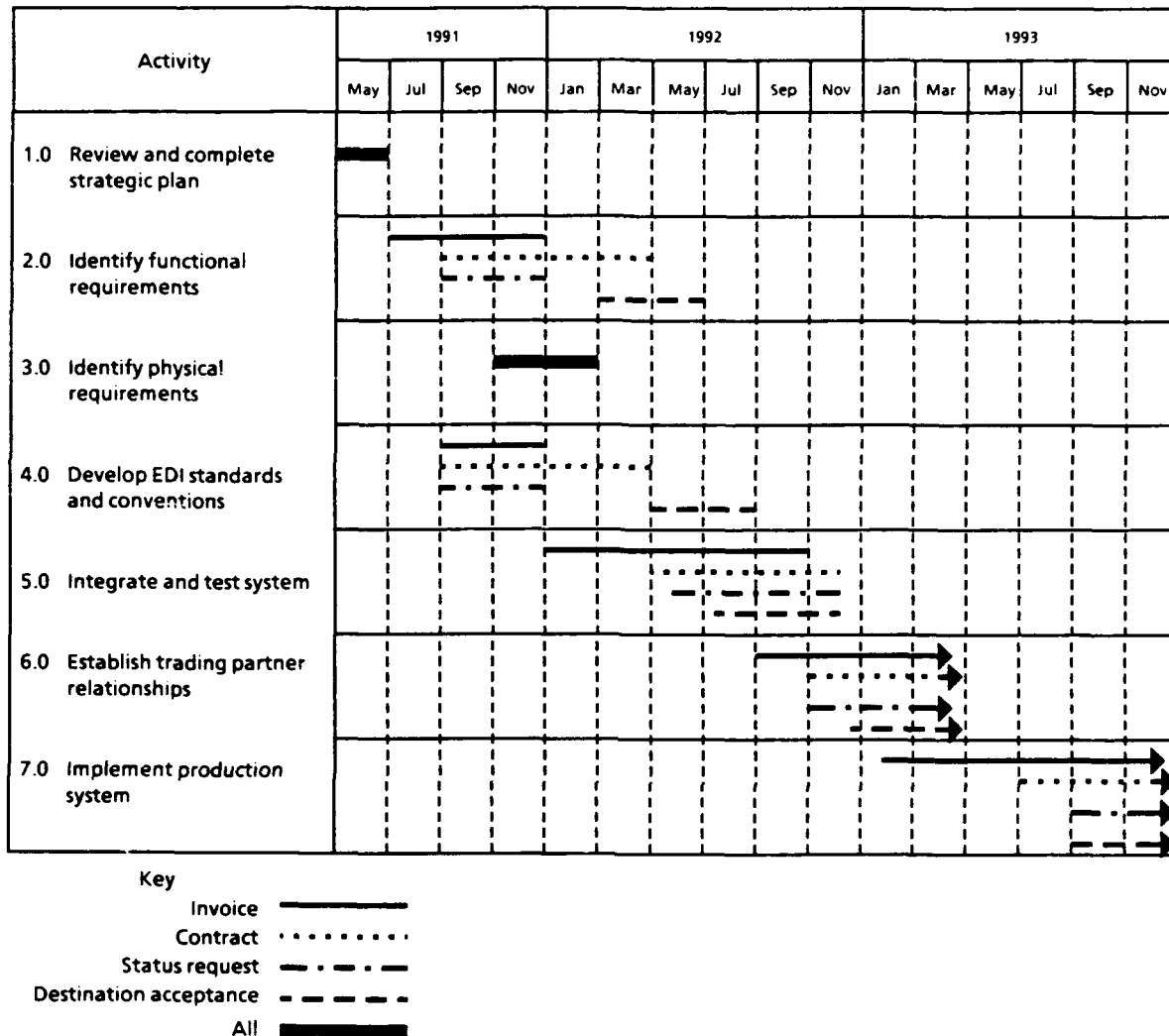
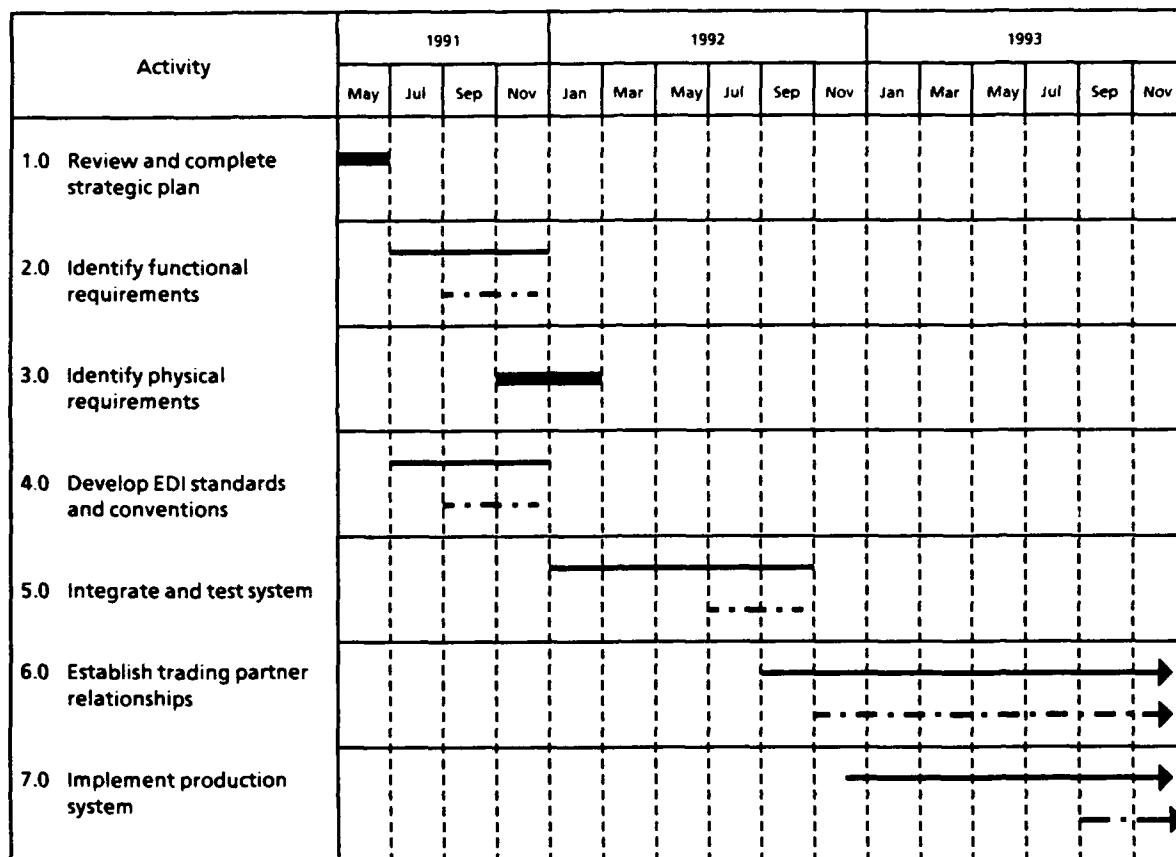


FIG. 6-1. IMPLEMENTATION SCHEDULE: CAS PAYMENTS

Fund implementation schedule in Figure 6-2. Since this area is less complicated than CAS payments, we estimate that DFAS-CO could begin implementing a production system in December 1992, approximately 2 months before CAS payments.

### O&M Payments

Although the O&M payments area offers a favorable EDI opportunity, it currently lacks the necessary applications systems to support EDI. As a result, we delay most of the O&M activities until November 1991, when the SRD-1 system is scheduled to be implemented. Because of its late start, this area should benefit from



Key

Invoice —————

Contract ..... .

Status request - - - - -

Destination acceptance - - - - -

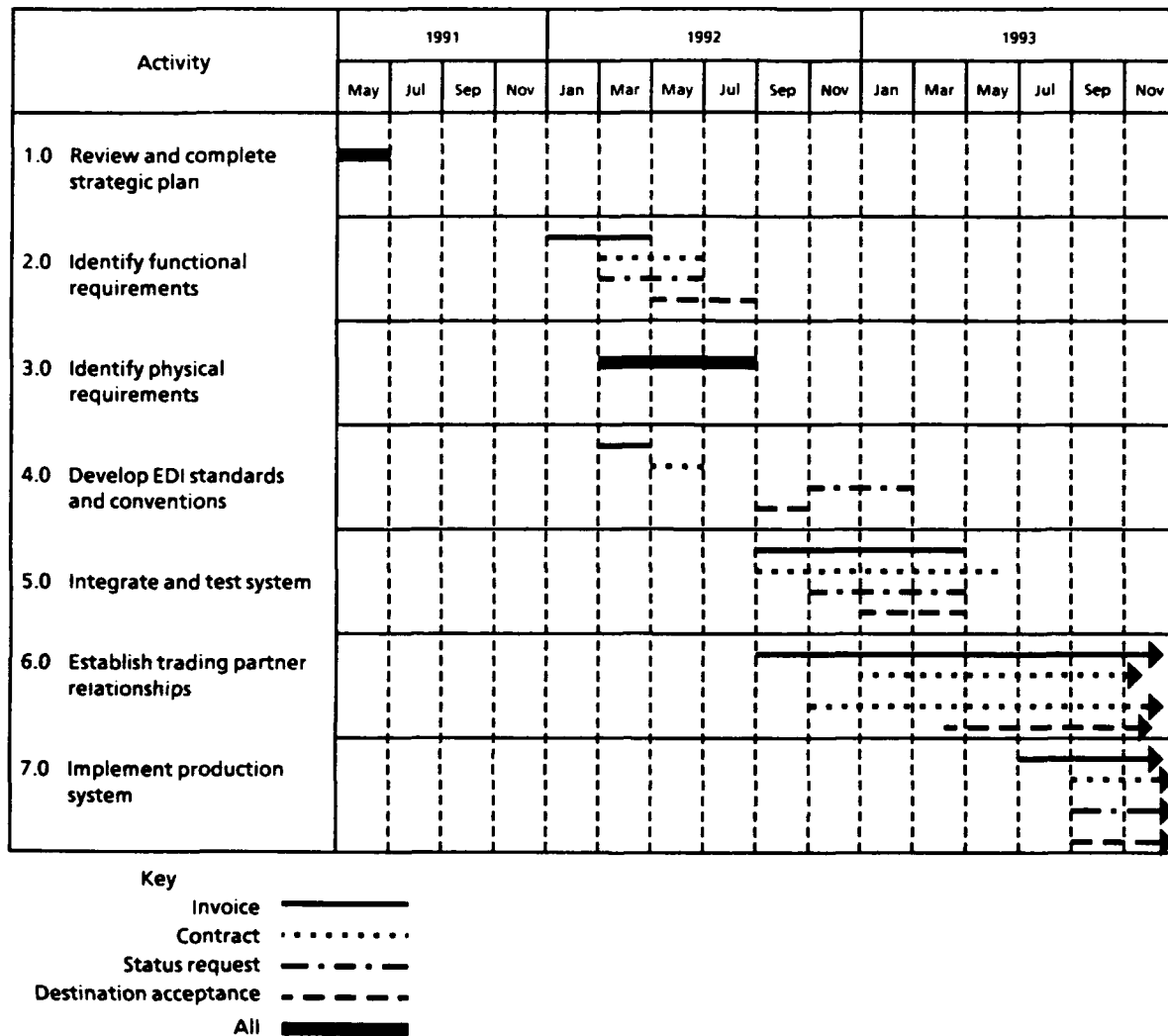
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FIG. 6-2. IMPLEMENTATION SCHEDULE: STOCK FUND PAYMENTS

much of the EDI development work in the CAS and Stock Fund areas, particularly the functional and physical requirements, standards development, and system integration and testing. Some of the initial delay should be made up in the latter stages of the implementation plan. Figure 6-3 shows the O&M payments implementation schedule.

### Disbursing and Collecting

While DFAS-CO currently has an active EFT program, we believe that expanding it to other trading partners offers significant paybacks. (We do not show a



**FIG. 6-3. IMPLEMENTATION SCHEDULE: O&M PAYMENTS**

separate implementation schedule because the capability already exists.) We suggest that DFAS-CO expand its EFT implementation efforts by developing a comprehensive trading partner marketing plan and procedures for bringing new trading partners into its program. Although few in number compared to the CAS, Stock Fund, and O&M plans, these activities are critical given the large growth in payment volumes projected for Disbursing and Collecting in the very near future.



## **SUMMARY**

By following the EDI implementation strategy presented in this chapter, we believe that DFAS-CO could reap benefits in excess of \$61 million over a 10-year period for a relatively modest investment of \$2.1 million. DFAS-CO's trading partners, both internal and external to DoD, would need to follow implementation plans similar to those presented in this chapter, at a total cost of nearly \$6.6 million.

## **APPENDIX A**

### **CAS TRADING PARTNERS**

**This appendix identifies the major trading partners, both internal and external to the Department of Defense (DoD), of the Defense Finance and Accounting Service – Columbus Center's (DFAS-CO's) Contract Administration Services (CAS) Payments Directorates.**

#### **INTERNAL TRADING PARTNERS**

**Table A-1 lists the major Military Service and Defense agency buying activities (referred to as procurement offices) that transact business with the five CAS Payments Directorates. Thirty-one of those offices generate more than 80 percent of the CAS contracts, with 5 of the largest 13 being Defense Logistics Agency (DLA) supply centers.**

**Table A-2 shows the Defense Contract Management Area Operations (DCMAOs) and Defense Plant Representative Offices (DPROs) supported by the three operational CAS Payment Directorates (Western, Mid-Atlantic, and Northeast).**

#### **EXTERNAL TRADING PARTNERS**

**Table A-3 lists the 100 largest CAS external trading partners. We developed this list from a sample of the invoices paid during the period October through December of 1990. Those vendors generated approximately 40 percent of all CAS invoices during that period.**

TABLE A-1

## CONTRACT VOLUMES: CAS PAYMENTS

Procurement office	Military Service/ Defense Agency	Location	CAS Directorate (Number of contracts)			
			Western	Mid-Atlantic	Northeast	Total
Defense Industrial Supply Center	DLA	Philadelphia, PA	11,321	2,402	1,701	15,424
Ships Parts Control Center	Navy	Mechanicsburg, PA	6,004	2,619	2,286	10,909
U.S. Navy Aviation Supply Office	Navy	Philadelphia, PA	5,664	2,228	2,293	10,185
Defense Construction Supply Center	DLA	Columbus, OH	6,317	918	1,454	8,689
Defense Electronics Supply Center	DLA	Dayton, OH	3,695	1,384	2,140	7,219
San Antonio Air Logistics Center	Air Force	Kelly AFB, TX	4,026	669	831	5,526
Warner-Robins Air Logistics Center	Air Force	Robins AFB, GA	2,883	501	687	4,071
Sacramento Air Logistics Center	Air Force	McClellan AFB, CA	2,978	424	581	3,983
Oklahoma City Air Logistics Center	Air Force	Tinker AFB, OK	3,339	12	495	3,846
Army Communications and Electronic Materiel Readiness Command	Army	Ft. Monmouth, NJ	1,550	1,140	705	3,395
Ogden Air Logistics Center	Air Force	Hill AFB, UT	2,589	267	413	3,269
Defense General Supply Center	DLA	Richmond, VA	245	1,865	1,142	3,252
Defense Personnel Support Center	DLA	Philadelphia, PA	641	1,439	826	2,906
Headquarters, U.S. Army Missile Command	Army	Redstone Arsenal, AL	1,898	442	448	2,788
PACAF Contracting Center	Air Force	Hickam AFB, HI	2,758	-	-	2,758
Naval Regional Contracting Center	Navy	Philadelphia, PA	1,368	142	1,041	2,551
Troop Support and Aviation Materiel Readiness Command	Army	St. Louis, MO	1,443	606	349	2,398

**Source:** Information Processing Center - Columbus report, active Mechanization of Contract Administration Services (MOCAS) contracts as of 26 November 1990.

**Note:** PACAF = Pacific Air Forces; AFB = Air Force Base.

**TABLE A-1**  
**CONTRACT VOLUMES: CAS PAYMENTS (Continued)**

Procurement office	Military Service/ Defense Agency	Location	CAS Directorate (Number of contracts)			
			Western	Mid-Atlantic	Northeast	Total
Naval Sea Systems Command	Navy	Washington, DC	1,365	332	682	2,379
Naval Regional Contracting Center	Navy	Long Beach, CA	1,738	91	89	1,918
Armament Materiel Readiness Command	Army	Rock Island, IL	887	316	414	1,617
Office of Naval Research	Navy	Arlington, VA	1,225	129	100	1,454
Naval Underwater Systems Center	Navy	Newport, RI	533	36	775	1,344
Naval Air Systems Command	Navy	Washington, DC	823	129	259	1,211
Tank/Automotive Command	Army	Warren, MI	601	225	205	1,031
Strategic Systems Project Office (Department of Navy)	Navy	Washington, DC	873	113	14	1,000
Naval Supply Center	Navy	Norfolk, VA	548	66	297	911
Directorate of R&D Contracting	Air Force	Wright-Patterson AFB, OH	740	65	32	837
Defense Construction Supply Center, Wood Products Branch	DLA	Columbus, OH	807	-	-	807
Naval Avionics Center	Navy	Indianapolis, IN	526	44	98	668
Naval Weapons Center	Navy	China Lake, CA	625	20	8	653
Space and Naval Warfare Systems Command	Navy	Washington, DC	515	69	68	652
Headquarters, EID/PK Tinker AFB	Air Force	Tinker AFB, OK	529	8	17	554
<b>Subtotal</b>			<b>70,247</b>	<b>18,701</b>	<b>20,450</b>	<b>109,398</b>
<b>Total contracts</b>			<b>87,221</b>	<b>21,411</b>	<b>24,102</b>	<b>132,734</b>
<b>Subtotal percent of total</b>			<b>80.5</b>	<b>87.3</b>	<b>84.8</b>	<b>82.4</b>

**Source:** Information Processing Center – Columbus report, active MOCAS contracts as of 26 November 1990.

**Note:** R&D = Research and Development.

**TABLE A-2**

**DCMAOs/DPROs SUPPORTED BY DFAS-CO**

<b>Directorate of Western CAS Payments</b>	<b>Directorate of Mid-Atlantic CAS Payments</b>
Operating Division El Segundo	Operating Division Bridgeport
DCMAO El Segundo	DCMAO Springfield
DPRO Lockheed Sunnyvale	DCMAO Bridgeport
DPRO McDonnell Douglas	DPRO Allied Signal
DPRO Hughes	DPRO ITT
DPRO FMC	DPRO Keafort Plessy
DPRO Ford	DPRO Textron
Operating Division Van Nuys	Operating Division All-American
DCMAO Van Nuys	DCMAO Philadelphia
DPRO General Dynamics Pomona	<b>Directorate of Northeast CAS Payments</b>
DPRO Litton	Operating Division Liberty
DPRO General Dynamics	DCMAO New York
DPRO Westinghouse	DCMAO Garden City
Operating Division San Francisco	DPRO Harris
DCMAO San Diego	DPRO Eaton AIL
DCMAO San Francisco	DPRO Grumman
Operating Division Santa Ana	DPRO Great Neck, UNISYS
DCMAO Santa Ana	Operating Division Bunker Hill
DCMAO Seattle	DCMAO Boston

**TABLE A-3**  
**TOP 100 VENDORS: CAS INVOICES**  
**(October - December 1990)**

Contractor	Location	CAS Directorate	Number of invoices
Hughes Aircraft	Fullerton, CA	Western	857
SAIC	San Diego, CA	Western	786
Allied Signal (Flight Systems Division)	Teterboro, NJ	Northeast	779
Litton Systems (Guidance and Control)	Woodland Hills, CA	Western	682
Allied Systems (Aerospace)	Torrance, CA	Western	517
Westinghouse Electric	Sunnyvale, CA	Western	488
ITT Gilfillan	Van Nuys, CA	Western	420
Gull Corporation	Smithtown, NY	Mid-Atlantic	390
Textron Lycoming	Stratford, CT	Northeast	378
FMC Corporation	Santa Clara, CA	Western	343
Raytheon	Goleta, CA	Western	297
ITT Corporation	Nutley, NJ	Northeast	281
Kearfott Guidance and Navigation	Wayne, NJ	Northeast	263
AMSTAR Corporation	New York, NY	Mid-Atlantic	261
Pride Products	Elizabeth, NJ	Northeast	245
EDO Corporation	College Point, NY	Mid-Atlantic	240
Imperial Oil	Morganville, NJ	Northeast	218
Allied Signal (Electric Power Division)	Eatontown, NJ	Northeast	207
NAVCOM Defense Electronics	El Monte, CA	Western	205
CAL Western Packing Corporation	Compton, CA	Western	202
Lockheed Aeronautical Systems	Ontario, CA	Western	185
Varian Associates	Palo Alto, CA	Western	181
TRW	Torrance, CA	Western	169
Sundstraw	San Diego, CA	Western	168
Contel Federal Systems	Marina Del Ray, CA	Western	165
Loral Electronic Systems	Yonkers, NY	Mid-Atlantic	163
Hazeltine	Greenlawn, NY	Mid-Atlantic	160
Smith Industries	Florham Park, NJ	Northeast	155
General Dynamics	San Diego, CA	Western	150
Tri/Valley Growers	San Francisco, CA	Western	150
Pacifica Services	Pasadena, CA	Western	150

**Note:** SAIC = Science Applications International Corporation; ITT = International Telephone and Telegraph; NAVCOM = Naval Communications.

TABLE A-3

**TOP 100 VENDORS: CAS INVOICES (Continued)**  
**(October – December 1990)**

Contractor	Location	CAS Directorate	Number of invoices
MILTOPE	Melville, NY	Mid-Atlantic	148
GEC Aerospace	Whippany, NJ	Northeast	148
SPS Technologies	Santa Ana, CA	Western	147
Engineering Visions	San Diego, CA	Western	142
Pulau Electronics	Chatsworth, CA	Western	139
Litton Systems	San Carlos, CA	Western	123
General Instrument	Belmont, CA	Western	122
Allfast Fastening Systems	City Industry, CA	Western	118
Textron	Valencia, CA	Western	117
Cubic Defense Systems	San Diego, CA	Western	114
Harris	Syosset, NY	Mid-Atlantic	114
Deutsch Company (Kelays Inc. Divisions)	E. Northport, NY	Mid-Atlantic	111
Kaiser Electronics	San Jose, CA	Western	111
Air Industries	Garden Grove, CA	Western	110
Rohr Industries	Chula Vista, CA	Western	109
Mindeco	Oceanside, NY	Mid-Atlantic	107
Hi-Shear	Torrance, CA	Western	105
McDonnell Douglas (Electronic Systems)	Huntington, CA	Western	105
Teledyne Systems	Northridge, CA	Western	104
McLaughlin Research	New York, NY	Mid-Atlantic	102
American Home Products	New York, NY	Mid-Atlantic	102
Litton Systems (Data Systems Division)	Van Nuys, CA	Western	100
Contel Federal Systems	Westlake Village, CA	Western	100
KAPCO Industries	Buena Park, CA	Western	99
Delmonte	San Francisco, CA	Western	99
Matthews Lumber	Kirkland, WA	Western	98
Aero Engineering & Manufacturing	Valencia, CA	Western	95
FEL Corporation	Farmingdale, NJ	Northeast	93
Parker-Hannifin (Aerospace Division)	Irvine, CA	Western	92
Scientific-Atlanta	San Diego, CA	Western	90
Dorne & Magolin	Bohemia, NY	Mid-Atlantic	90
Duffy Electronics	Belmar, NJ	Northeast	89

**Note:** GEC = General Electric Corporation.

TABLE A-3

**TOP 100 VENDORS: CAS INVOICES (Continued)**  
**(October - December 1990)**

Contractor	Location	CAS Directorate	Number of invoices
ABEX Corporation (Aerospace Division)	Oxnard, CA	Western	87
Jay-El Products	Carson, CA	Western	87
Spreckles Sugar	Pleasanton, CA	Western	83
Rotair Industries	Bridgeport, CT	Northeast	80
McKeown Robert	Branchburg, NJ	Northeast	80
Sargent-Fletcher	El Monte, CA	Western	80
Teltronix	Beaverton, OR	Western	79
SRI International	Menlo Park, CA	Western	78
Support Systems Assoc.	Huappauge, NY	Mid-Atlantic	78
Octagon Process	Edgewater, NJ	Northeast	78
Teledyne Hydrapower	New Rochelle, NY	Mid-Atlantic	77
Llamas Plastics	Sylmar, CA	Western	77
Oregon Freeze Dry Foods	Albany, OR	Western	77
Zeus Components	Port Chester, NY	Mid-Atlantic	76
Plessey Electronic Systems	Wayne, NJ	Northeast	75
The RAND Corporation	Santa Monica, CA	Western	75
Parker Hannifin (Fuel Products Division)	Irvine, CA	Western	74
Litton Systems (Applied Technology)	San Jose, CA	Western	73
Plessey Electronic Systems	San Marcos, CA	Western	73
Barden Corporation	Danbury, CT	Northeast	72
Continental Mills	Kent, WA	Western	72
Hyster Company	Portland, OR	Western	71
Litton Systems (Aero Products Division)	Moorpark, CA	Western	69
Sterer Engineering and Manufacturing	Los Angeles, CA	Western	69
Lucas Western	City of Indu, CA	Western	68
Ocean Technology	Burbank, CA	Western	68
Voi Shan (Fairchild)	Carson, CA	Western	67
Imo Corporation	Croton Falls, NY	Mid-Atlantic	67
Mars, Inc.	Hackettstown, NJ	Northeast	67
Telog Corporation	Santa Monica, CA	Western	65
Systems Engineering & Management	Carlsbad, CA	Western	65
Tecolote Research	Santa Barbara, CA	Western	65



**TABLE A-3****TOP 100 VENDORS: CAS INVOICES (Continued)**  
**(October - December 1990)**

<b>Contractor</b>	<b>Location</b>	<b>CAS Directorate</b>	<b>Number of invoices</b>
Unicor Federal	Danbury, CT	Northeast	65
Libracope Corporation	Glendale, CA	Western	64
Crane Company	Burbank, CA	Western	64
Precision Wood Products	Vancouver, WA	Western	64
Subtotal	—	—	16,133
Total number of invoices for period	—	—	40,553
Subtotal percent of total	—	—	39.8

## **APPENDIX B**

### **DFAS-CO AUTOMATED SYSTEMS**

This appendix describes three automated systems used by the Defense Finance and Accounting Service – Columbus Center (DFAS-CO) to carry out its payment and cash management responsibilities.

#### **MECHANIZATION OF CONTRACT ADMINISTRATION SERVICES**

The Mechanization of Contract Administration Services (MOCAS) is a batch-oriented system developed in 1968 for the payment of Department of Defense (DoD) contracts. Updated in the early 1980s to an on-line, interactive system, it is written in Common Business Oriented Language (COBOL) and MANTIS and runs on IBM operating systems.<sup>1</sup>

Each working day, the Contract Administration Services (CAS) Payments Directorates enter approximately 750 contractual documents into the MOCAS system. The primary contractual documents processed by MOCAS are DD (Defense Department) Form 1155 (Order for Supplies and Services), SF (Standard Form) 30 (Amendment of Solicitation/Contract Modification), and SF 26 (Contract Award). MOCAS also processes some nonstandard, Navy contractual documents.

Military Service and Defense agency procurement offices send copies of their contracts to DFAS-CO for input into MOCAS. Although all contracts arrive in hard-copy form through the mail, approximately 30 percent of the contract abstracts are sent to DFAS-CO electronically using Military Standard Contract Administration Procedures (MILSCAP) formats.

After producing and/or shipping various line items in accordance with the terms of a contract, the contractor (vendor) sends an invoice (usually a DD Form 250, although 30 percent are either contractor invoice forms, Government public vouchers using SF 1034, or progress payment requests using the SF 1443) to DFAS-CO, where

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<sup>1</sup>MANTIS is an application development language developed by CINCOM Systems, Inc., that runs on International Business Machines (IBM) mainframes, Digital VAX Series, Honeywell, NCR, and Siemens computers.

it is entered into MOCAS. [For some exceptional cases, such as a vendor's first progress payment, the invoice is first sent to a Defense Contract Management Area Operation (DCMAO) for review and then on to DFAS-CO.] At DFAS-CO, the Contract Accounting Operating Division assures that the contractual provisions have been met. If the contract calls for source acceptance and inspection, the contractor is also responsible for obtaining the appropriate Quality Assurance Representative's authorization on DD Form 250 prior to submitting it to a DCMAO for processing. If destination acceptance is specified by the contract, then a destination acceptance form (usually DD Form 250) must be received from the consignee indicating that the shipment has been accepted. Once these conditions are met, the invoice is sent to the Directorate of Disbursing and Collecting.

The DFAS-CO currently pays almost 50 percent of its invoices through the Automatic Payment of Invoices system. If an invoice does not qualify for automatic payment, it is sent to the Invoice Control Group, which determines whether the invoice should be paid, made payable, or returned to the contractor for additional information. All payable invoices are sent to the Contract Entitlement Branch in the appropriate CAS Payments Directorate.

If an invoice is not payable because of inconsistent data, it is sent to the Line Item and Invoice Research Group for further review and analysis. If the Contract Entitlement Branch determines that a payment can be made, it sends the invoice to the Analysis and Control Group, which posts the disbursement into the appropriate control ledger and sends the invoice to Disbursing to match up with the check and subvoucher. If no problems are found, then full (or partial) payment is made and either mailed or sent electronically to the contractor using electronic funds transfer. If the invoice is subject to cash management, it goes into suspense and MOCAS creates the check at the appropriate time.

## **STANDARD AUTOMATED MATERIAL MANAGEMENT SYSTEM**

The Standard Automated Material Management System (SAMMS) provides worldwide support for the Defense Logistics Agency's (DLA's) wholesale material management mission. Approximately 3,500 requisitioners currently use SAMMS, which has five major subsystems: distribution, procurement, requirements, cataloging, and financial.

The financial subsystem, under the operational control of the Directorate of Stock Fund Accounting and Payments, makes vendor payments, provides Stock Fund accounting and reporting services, and performs billing services and adjustments for military customers of the Defense Stock Fund. Stock Funds, which operate as revolving funds, are used to finance inventories of supplies for DoD depots. Thus, DoD procurement activities benefit from the operation of a Stock Fund by not being required to finance inventories of supplies. Each Military Service has a Stock Fund; all Defense agencies use a common Stock Fund.

In FY91, DFAS-CO expects SAMMS to process more than 340,000 invoices worth almost \$250 million. Approximately 57 percent of those invoices are currently processed electronically using the SAMMS Procurement by Electronic Data Exchange (SPEDE) system, with 80 percent paid automatically.

The primary documents processed by the Stock Fund Directorate using SAMMS include DD Form 1155 and commercial invoices.

#### **AUTOMATED PAYROLL COST AND PERSONNEL SYSTEM**

Developed and implemented in 1969, the Automated Payroll Cost and Personnel System (APCAPS) is an integrated civilian pay, cost, performance, personnel, and manpower position control system supporting approximately 60,000 DoD employees throughout the United States. It is currently under the control of the Directorate of Accounting and Payments.

The APCAPS has four basic subsystems: personnel, payroll, cost, and appropriation accounting. The personnel subsystem processes administrative data for DLA, DoD, and other employees. The payroll subsystem produces employee paychecks; maintains pay, leave, and retirement records; and provides employee operations costs to other APCAPS subsystems as required. The cost subsystem contains a record for every local position established as well as a record for every employee. That information is used to formulate numerous cost and performance reports, measure employee and organizational effectiveness, provide long-range budget planning, and support day-to-day management decisions. Finally, the appropriation accounting subsystem provides a uniform system of accounting throughout DLA, performing such functions as funds control, formal ledger accounting, appropriation record maintenance, job order accounting, and financial reporting.

## **APPENDIX C**

### **EDI COST SAVINGS**

This appendix describes our methodology for computing the cost savings that would accrue to the Defense Finance and Accounting Service – Columbus Center (DFAS-CO) if it implemented the electronic data interchange (EDI) operating concepts presented in Chapter 4. It draws extensively upon an approach that we developed for the Executive Agent for Electronic Data Interchange and Data Protection.<sup>1</sup> We first calculate the direct cost savings, then we estimate the savings that could result indirectly from implementing EDI. We conclude by applying assumed implementation rates to calculate the life-cycle savings.

#### **DIRECT COST SAVINGS**

Direct cost savings occur primarily because EDI permits an activity to eliminate manual processing of paper documents such as sorting, distribution, mailing, data input, customer services, and storage. Table C-1 shows our projected cost savings, broken out by process activity, for each of the documents routinely used by DFAS-CO.

We used engineered work standards, most of which were developed by Defense Finance and Accounting Service – Indianapolis Center, to allocate the direct cost savings among the individual processing activities. We used DFAS-CO's own work standards for three documents – SF (Standard Form) 26, SF 30, and DD (Defense Department) Form 1155.

The complexity of contract documents makes their processing more costly than that of invoice or payment documents. To calculate the cost of processing an individual contract at DFAS-CO, we divided the average number of contracts that each clerk processes in a day by the average clerk's daily, fully burdened wage. (As Table C-2 shows, the most expensive document to process is SF 26, Contract Award,

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<sup>1</sup>LMI Report DL001-06R1, *A Business Case for Electronic Commerce*, Thomas P. Hardcastle and Thomas W. Heard, September 1990.

TABLE C-1

**DIRECT COST SAVINGS PER DOCUMENT: DFAS-CO**  
(dollars)

Processing activity	Document									
	Contracts			Invoices				Destination acceptance (DD Form 250)	Status request	Payment (check)
	SF 26	DD Form 1155	SF 30	DD Form 250	SF 1443	SF 1034	Coml.			
Distribution	—	—	—	—	—	—	—	—	—	0.02
Mailing	—	—	—	—	—	—	—	—	—	0.26
Receipt	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.02	—
Processing	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	—	1.36 <sup>a</sup>
Preparation and control	1.89	1.26	1.46	0.47	0.21	0.21	0.47	0.47	—	—
Data entry	1.53	1.02	1.18	0.17	0.17	0.17	0.17	0.17	—	—
Error resolution	0.81	0.54	0.62	0.07	0.07	0.09	0.07	0.07	—	—
Storage and retrieval	0.16	0.16	0.16	—	0.16	—	—	—	—	—
Customer service	—	—	—	—	—	—	—	—	0.21 <sup>b</sup>	—
Subtotal	4.67	3.26	3.70	1.00	0.89	0.75	1.00	1.00	0.23 <sup>b</sup>	1.64
Less telecommunications	-0.05	-0.05	-0.07	-0.05	-0.05	-0.05	-0.05	-0.05	-0.02	-0.02
Total	4.62	3.21	3.63	0.95	0.84	0.70	0.95	0.95	0.21	1.62

**Note:** Coml. = commercial.

<sup>a</sup> Assumes that 22 of 35 cash management GS-5 (General Schedule) Step 1 personnel could be saved.

<sup>b</sup> Assumes that 8 of the 25 GS-6 contractor relations personnel could be saved (8 GS-6 @ \$18,919 w/30% fringe = \$24,595 × 8 = \$325,000; \$196,760 ÷ 934,693 invoices = \$0.21/invoice).

at \$4.23 per document.) We then allocated the per-document costs over three processing activities: Preparation and Control, Data Entry, and Error Resolution.

Additionally, using information supplied by DFAS-CO, we estimated the cost of processing payments and invoices, which generally entails telephone calls to DFAS-CO customer relations staff, at \$0.21 per solicitation.

By switching from manual to electronic processing, DFAS-CO should reduce its document processing activities, but its telecommunications costs should increase. Consequently, we subtracted telecommunications costs, ranging from \$0.02 to \$0.07 per document, from the direct cost savings to produce a net savings per document.

## INDIRECT COST SAVINGS

Most indirect cost savings from EDI result from efficiencies and improvements made possible by eliminating the operating restrictions that paper documents place upon an organization. We expect that DFAS-CO would reap a variety of indirect

TABLE C-2

## CLERICAL PROCESSING SAVINGS FOR CONTRACT DOCUMENTS

Document	Average number of contracts processed per clerk per day	Daily burdened wage <sup>a</sup> (\$)	Savings potential per document (\$)
SF 26	20	84.76	4.23
SF 30	26	84.76	3.26
DD Form 1155	30	84.76	2.82

<sup>a</sup> Assumes wage for GS-5 Step 1 @ \$8.15/hour × 8 hours × \$1.30 fringe benefit = \$84.76/day.

benefits such as reduced interest payments, improved shipment tracing and pre-payment auditing, and streamlined operations. One major category of indirect cost savings that we identified in our business case – inventory reduction – probably does not apply to DFAS-CO. However, inventory reduction resulting from EDI could be expected at Department of Defense activities (such as Defense Logistics Agency depots and Military Service installations) that conduct business with DFAS-CO.

Many private-sector firms have found that the indirect cost savings from EDI greatly exceed the direct cost savings. In fact, private industry often assumes \$3 in indirect cost savings for every \$1 in direct cost savings realized. In our business case, we used a conservative 1.8:1 indirect-to-direct cost savings ratio, drawing extensively upon our experience in implementing EDI in Defense transportation.

To realize the indirect savings possible through EDI, activities need to change their business practices and, oftentimes, make significant enhancements to their applications software. Although we exclude indirect benefits from our cost savings calculations, we do include the cost of modifying DFAS-CO's applications software in our investment figures. As a consequence, we believe that the \$61 million in direct savings is a conservative estimate of the total savings possible at DFAS-CO.

## IMPLEMENTATION RATES

Table C-3 shows the number of copies of each document that DFAS-CO processes annually in three mission areas: Contract Administration Services (CAS), Stock Fund, and Operations and Maintenance (O&M) payments. It also shows the

direct cost savings associated with each document replaced by an electronic transmission and the total savings possible each year, all assuming a 100 percent replacement of paper and constant workload volumes. Neither assumption is likely to hold. DFAS-CO will find that some of its trading partners continue to mail their invoices and to request payment by check; we also know that DFAS-CO's workload is projected to increase over the next several years.

**TABLE C-3**  
**CALCULATION OF ANNUAL DIRECT COST SAVINGS: DFAS-CO**

Document	Volume				Cost savings per document (\$)	Direct cost savings			
	CAS	Stock Fund	O&M	Total		CAS (\$)	Stock Fund (\$)	O&M (\$)	Total (\$)
<b>Contracts</b>									
SF 26	15,691	1,327	14,516	31,534	4.62	72,492	0 <sup>a</sup>	67,064	139,556
DD Form 1155	60,869	55,598	51,078	167,545	3.21	195,389	0 <sup>a</sup>	163,960	359,350
SF 30	103,440	1,327	7,258	112,025	3.63	375,487	0 <sup>a</sup>	26,347	401,834
Subtotal	180,000	58,252	72,852	311,104	—	643,369	0 <sup>a</sup>	257,371	900,740
<b>Invoices</b>									
DD Form 250	299,988	0	100	300,088	0.95	284,989	0	95	285,084
SF 1443	9,230	0	50	9,280	0.84	7,753	0	42	7,795
SF 1034	55,382	0	116,134	171,516	0.70	38,767	0	81,294	120,061
Commercial	96,919	211,722	145,168	453,809	0.95	92,073	201,136	137,910	431,119
Subtotal	461,519	211,722	261,452	934,693	—	423,582	201,136	219,340	844,059
Dest. accept.	58,212	0	21,779	79,991	0.95	55,301	0 <sup>a</sup>	20,690	75,991
Status requests	461,519	211,722 <sup>b</sup>	261,452 <sup>b</sup>	934,693	0.21	96,919	44,462	54,905	196,286
Payment (check)	115,380 <sup>c</sup>	26,465 <sup>d</sup>	130,726 <sup>e</sup>	272,571	1.62	186,916	42,873	211,776	441,565
<b>Total</b>	<b>1,276,630</b>	<b>508,161</b>	<b>748,261</b>	<b>2,533,052</b>	<b>—</b>	<b>1,406,087</b>	<b>288,471</b>	<b>764,082</b>	<b>2,458,641</b>

Note: Dest. accept = destination acceptances.

<sup>a</sup> Savings already realized through the Standard Automated Material Management System (SAMMS) Active Contracts File.

<sup>b</sup> For commissary payments (Stock Fund and O&M only) one status request per payment is used. For all other areas, one status request per invoice is used.

<sup>c</sup> CAS uses a 4:1 ratio of invoices to payments.

<sup>d</sup> Stock Fund uses an 8:1 ratio of invoices to payments.

<sup>e</sup> O&M uses a 2:1 ratio of invoices to payments.

Table C-4 shows the projected implementation rates for DFAS-CO's EDI program following the priorities established in Chapter 4. We assume gradual implementation rates for each of DFAS-CO's documents – invoices, contracts, destination acceptance, status requests, and payments. Electronic transactions



would begin in the last quarter of FY92. In the first year, we project a 10 percent increase in electronic funds transfer (EFT) transactions for CAS and Stock Fund payments, and a 6 percent increase in Stock Fund electronic invoices, on top of the 57 percent of Stock Fund invoices currently sent electronically through SAMMS Procurement by Electronic Data Exchange (SPEDE).

In FY93, we assume that EDI transactions would begin in the CAS payments area, first for invoices (20 percent) and status requests (20 percent) followed by contracts (10 percent) and destination acceptances (10 percent). EFT payments would increase to 20 percent in the CAS payments, Stock Fund, and O&M areas. Electronic transmission of Stock Fund invoices would also increase, but the total percentage would actually decrease from 6 to 5 percent because of the large increase in invoice volume as the remaining Defense Logistics Agency inventory control points are transferred to DFAS-CO control.<sup>2</sup>

A small portion of O&M EFT payments (20 percent) are expected to be transmitted electronically by the end of FY93, with the EDI transactions beginning in earnest in FY94. Those transactions should grow at a rate similar to the CAS and Stock Fund areas in subsequent years.

Since some paper transactions will be required for the foreseeable future, most of our implementation rates level off at 80 percent, the ceiling we assumed in our business case. The exceptions include

- *All Invoice Documents.* We assume a 70 percent ceiling on invoices in all three areas (CAS, Stock Fund, and O&M) because of the large number of external trading partners. For example, in the CAS payments area alone, at least 350 vendors must be EDI capable before DFAS-CO can achieve the 70 percent level.
- *Destination Acceptances for CAS and O&M.* Due to the large number of receiving activities and the current difficulties encountered by DFAS-CO in receiving destination acceptance invoices, we assume a 40 percent ceiling on destination acceptances.

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<sup>2</sup>Because of growth, the 6 percent rate in FY92 translates into a rate of 13 percent of the FY91 volume. Adding this 13 percent to the current 57 percent SPEDE level totals 70 percent or the implementation rate target of the Stock Fund Directorate.

TABLE C-4

## PROJECTED EDI IMPLEMENTATION RATES: DFAS-CO FOR FY92 THROUGH FY01

(Percent of documents)

Documents	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01
<b>CAS</b>										
<i>Contracts</i>										
SF 26	0	10	40	65	75	80	80	80	80	80
DD Form 1155	0	10	40	65	75	80	80	80	80	80
SF 30	0	10	40	65	75	80	80	80	80	80
<i>Invoices</i>										
DD Form 250	0	20	50	65	70	70	70	70	70	70
SF 1443	0	20	50	65	70	70	70	70	70	70
SF 1034	0	20	50	65	70	70	70	70	70	70
Commercial	0	20	50	65	70	70	70	70	70	70
<i>Destination acceptance</i>	0	10	15	20	25	30	35	40	40	40
<i>Status requests</i>	0	20	50	65	70	75	80	80	80	80
<i>Payment</i>	10	20	30	50	65	75	80	80	80	80
<b>Stock Fund</b>										
<i>Contracts</i>										
SF 26	0	0	0	0	0	0	0	0	0	0
DD Form 1155	0	0	0	0	0	0	0	0	0	0
SF 30	0	0	0	0	0	0	0	0	0	0
<i>Invoices</i>										
DD Form 250	6	5	10	20	45	60	70	70	70	70
SF 1443	6	5	10	20	45	60	70	70	70	70
SF 1034	6	5	10	20	45	60	70	70	70	70
Commercial	6	5	10	20	45	60	70	70	70	70
<i>Destination acceptance</i>	0	0	0	0	0	0	0	0	0	0
<i>Status request</i>	0	5	5	20	45	60	70	80	80	80
<i>Payment</i>	10	20	30	50	65	75	80	80	80	80
<b>O&amp;M</b>										
<i>Contracts</i>										
SF 26	0	0	10	40	65	75	80	80	80	80
DD Form 1155	0	0	10	40	65	75	80	80	80	80
SF 30	0	0	10	40	65	75	80	80	80	80
<i>Invoices</i>										
DD Form 250	0	0	20	50	65	70	70	70	70	70
SF 1443	0	0	20	50	65	70	70	70	70	70
SF 1034	0	0	20	50	65	70	70	70	70	70
Commercial	0	0	20	50	65	70	70	70	70	70
<i>Destination acceptance</i>	0	0	10	15	20	25	30	40	40	40
<i>Status request</i>	0	0	20	50	65	70	80	80	80	80
<i>Payment</i>	0	20	30	50	65	75	80	80	80	80

- *Contracts and Destination Acceptances for Stock Fund Payments.* We assume no implementation rates for these categories because DFAS-CO already receives them electronically through the Active Contracts File.

#### **LIFE-CYCLE DIRECT COST SAVINGS**

To calculate the life-cycle direct cost savings from implementing EDI at DFAS-CO, we merge the savings per document (Table C-1), the projected workload by document and year (Table C-5), and the projected rates at which DFAS-CO would replace those documents with electronic transmissions (Table C-4). The result is shown in Table C-6.

TABLE C-5

## PROJECTED DFAS-CO WORKLOAD FOR FY92 THROUGH FY01

(Number of documents processed)

Documents	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	10-year total
<b>MOCAS</b>											
<i>Contracts</i>											
SF 26	23,827	31,963	40,099	37,877	37,877	37,877	37,877	37,877	37,877	37,877	361,028
DD Form 1155	92,431	123,992	155,554	146,934	146,934	146,934	146,934	146,934	146,934	146,934	1,400,515
SF 30	157,075	210,712	264,347	275,189	275,189	275,189	275,189	275,189	275,189	275,189	2,558,457
Subtotal	273,333	366,667	460,000	460,000	460,000	460,000	460,000	460,000	460,000	460,000	4,320,000
<i>Invoices</i>											
DD Form 250	676,660	1,053,331	1,430,003	1,430,003	1,430,003	1,430,003	1,430,003	1,430,003	1,430,003	1,430,003	13,170,015
SF 1443	20,819	32,409	43,998	43,998	43,998	43,998	43,998	43,998	43,998	43,998	405,212
SF 1034	124,921	194,460	263,999	263,999	263,999	263,999	263,999	263,999	263,999	263,999	2,431,373
Commercial	218,613	340,306	462,000	462,000	462,000	462,000	462,000	462,000	462,000	462,000	4,254,919
Subtotal	1,041,013	1,620,506	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	20,261,519
Dest. accept.	131,281	204,351	277,420	277,420	277,420	277,420	277,420	277,420	277,420	277,420	2,554,992
Status requests	1,041,013	1,620,506	2,220,000	2,220,000	2,220,000	2,220,000	2,220,000	2,220,000	2,220,000	2,220,000	20,261,519
Payment	260,253	405,127	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000	5,065,380
Total MOCAS	2,746,893	4,217,157	5,687,420	5,687,420	5,687,420	5,687,420	5,687,420	5,687,420	5,687,420	5,687,420	52,463,411
<b>SAMMS</b>											
<i>Contracts</i>											
SF 26	2,198	3,070	3,941	3,941	3,941	3,941	3,941	3,941	3,941	3,941	36,796
DD Form 1155	92,105	128,611	165,118	165,118	165,118	165,118	165,118	165,118	165,118	165,118	1,541,660
SF 30	2,198	3,070	3,941	3,941	3,941	3,941	3,941	3,941	3,941	3,941	36,796
Subtotal	96,501	134,751	173,000	173,000	173,000	173,000	173,000	173,000	173,000	173,000	1,615,252
<i>Invoices</i>											
DD Form 250	0	0	0	0	0	0	0	0	0	0	0
SF 1443	0	0	0	0	0	0	0	0	0	0	0
SF 1034	0	0	0	0	0	0	0	0	0	0	0
Commercial	444,481	677,241	910,000	910,000	910,000	910,000	910,000	910,000	910,000	910,000	8,401,722
Subtotal	444,481	677,241	910,000	910,000	910,000	910,000	910,000	910,000	910,000	910,000	8,401,722
Dest. accept.	0	0	0	0	0	0	0	0	0	0	0
Status requests	1,920,481	2,153,241	2,386,000	2,386,000	2,386,000	2,386,000	2,386,000	2,386,000	2,386,000	2,386,000	23,161,722
Payment	1,531,560	1,560,655	1,589,750	1,589,750	1,589,750	1,589,750	1,589,750	1,589,750	1,589,750	1,589,750	15,810,215
Total SAMMS	3,993,023	4,525,888	5,058,750	5,058,750	5,058,750	5,058,750	5,058,750	5,058,750	5,058,750	5,058,750	48,988,911
<b>O&amp;M</b>											
<i>Contracts</i>											
SF 26	26,614	38,712	50,810	50,810	50,810	50,810	50,810	50,810	50,810	50,810	471,806
DD Form 1155	93,647	136,216	178,786	178,786	178,786	178,786	178,786	178,786	178,786	178,786	1,660,151
SF 30	13,307	19,356	25,405	25,405	25,405	25,405	25,405	25,405	25,405	25,405	235,903
Subtotal	133,568	194,284	255,001	255,001	255,001	255,001	255,001	255,001	255,001	255,001	2,367,860
<i>Invoices</i>											
DD Form 250	114	128	143	143	143	143	143	143	143	143	1,386
SF 1443	57	64	71	71	71	71	71	71	71	71	690
SF 1034	132,650	149,166	165,682	165,682	165,682	165,682	165,682	165,682	165,682	165,682	1,607,272
Commercial	165,813	186,458	207,104	207,104	207,104	207,104	207,104	207,104	207,104	207,104	2,009,103
Subtotal	298,634	335,816	373,000	373,000	373,000	373,000	373,000	373,000	373,000	373,000	3,618,450
Dest. accept.	24,880	27,981	31,082	31,082	31,082	31,082	31,082	31,082	31,082	31,082	301,517
Status requests	622,635	659,817	697,000	697,000	697,000	697,000	697,000	697,000	697,000	697,000	6,858,452
Payment	473,317	491,909	510,500	510,500	510,500	510,500	510,500	510,500	510,500	510,500	5,049,226
Total O&M	1,553,034	1,709,807	1,866,583	1,866,583	1,866,583	1,866,583	1,866,583	1,866,583	1,866,583	1,866,583	18,195,505
<b>Total DFAS-CO</b>	<b>8,292,950</b>	<b>10,452,852</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>12,612,753</b>	<b>119,647,826</b>

Note: MOCAS = Mechanization of Contract Administration Services.

TABLE C-6

## LIFE-CYCLE DIRECT COST SAVINGS: DFAS-CO

(\$000)

Documents	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	10-year total
<b>MOCAS</b>											
<b>Contracts</b>											
SF 26	0	14,767	74,103	113,745	131,244	139,993	139,993	139,993	139,993	139,993	1,033,824
DD Form 1155	0	39,802	199,731	306,578	353,744	377,327	377,327	377,327	377,327	377,327	2,786,490
SF 30	0	76,488	383,831	649,308	749,202	799,149	799,149	799,149	799,149	799,149	5,854,574
Subtotal	0	131,057	657,665	1,069,631	1,234,190	1,316,469	1,316,469	1,316,469	1,316,469	1,316,469	9,674,888
<b>Invoices</b>											
DD Form 250	0	200,133	679,251	883,027	950,952	950,952	950,952	950,952	950,952	950,952	7,468,123
SF 1443	0	5,445	18,479	24,023	25,871	25,871	25,871	25,871	25,871	25,871	203,173
SF 1034	0	27,224	92,400	120,120	129,360	129,360	129,360	129,360	129,360	129,360	1,015,904
Commercial	0	64,658	219,450	285,285	307,230	307,230	307,230	307,230	307,230	307,230	2,412,773
Subtotal	0	297,460	1,009,580	1,312,455	1,413,413	1,413,413	1,413,413	1,413,413	1,413,413	1,413,413	11,099,973
Dest. accept.	0	19,413	39,532	52,710	65,887	79,065	92,242	105,420	105,420	105,420	665,109
Status requests	0	68,061	231,000	300,300	323,400	346,500	369,600	369,600	369,600	369,600	2,747,661
Payment	42,161	131,261	267,300	445,500	579,150	668,250	712,800	712,800	712,800	712,800	4,984,822
<b>Total MOCAS</b>	<b>42,161</b>	<b>647,252</b>	<b>2,205,077</b>	<b>3,180,596</b>	<b>3,616,040</b>	<b>3,823,697</b>	<b>3,904,524</b>	<b>3,917,702</b>	<b>3,917,702</b>	<b>3,917,702</b>	<b>29,172,453</b>
<b>SAMMS</b>											
<b>Contracts</b>											
SF 26	0	0	0	0	0	0	0	0	0	0	0
DD Form 1155	0	0	0	0	0	0	0	0	0	0	0
SF 30	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	0
<b>Invoices</b>											
DD Form 250	0	0	0	0	0	0	0	0	0	0	0
SF 1443	0	0	0	0	0	0	0	0	0	0	0
SF 1034	0	0	0	0	0	0	0	0	0	0	0
Commercial	25,335	32,169	86,450	172,900	389,025	518,700	605,150	605,150	605,150	605,150	3,645,179
Subtotal	25,335	32,169	86,450	172,900	389,025	518,700	605,150	605,150	605,150	605,150	3,645,179
Dest. accept.	0	0	0	0	0	0	0	0	0	0	0
Status requests	0	22,609	25,053	100,212	225,477	300,636	350,742	400,848	400,848	400,848	2,227,273
Payment	248,113	505,652	772,619	1,287,698	1,674,007	1,931,546	2,060,316	2,060,316	2,060,316	2,060,316	14,660,899
<b>Total SAMMS</b>	<b>273,448</b>	<b>560,430</b>	<b>884,122</b>	<b>1,560,810</b>	<b>2,288,509</b>	<b>2,750,882</b>	<b>3,016,208</b>	<b>3,066,314</b>	<b>3,066,314</b>	<b>3,066,314</b>	<b>20,533,351</b>
<b>O&amp;M</b>											
<b>Contracts</b>											
SF 26	0	0	23,474	93,897	152,582	176,057	187,794	187,794	187,794	187,794	1,197,186
DD Form 1155	0	0	57,390	229,561	373,037	430,427	459,122	459,122	459,122	459,122	2,926,903
SF 30	0	0	9,222	36,888	59,943	69,165	73,776	73,776	73,776	73,776	470,322
Subtotal	0	0	90,086	360,346	585,562	675,649	720,692	720,692	720,692	720,692	4,594,411
<b>Invoices</b>											
DD Form 250	0	0	27	68	88	95	95	95	95	95	658
SF 1443	0	0	12	30	39	42	42	42	42	42	291
SF 1034	0	0	23,196	57,989	75,385	81,184	81,184	81,184	81,184	81,184	562,490
Commercial	0	0	39,350	98,374	127,887	137,724	137,724	137,724	137,724	137,724	954,231
Subtotal	0	0	62,585	156,461	203,399	219,045	219,045	219,045	219,045	219,045	1,517,670
Dest. accept.	0	0	2,953	4,429	5,906	7,382	8,858	11,811	11,811	11,811	64,961
Status requests	0	0	29,274	73,185	95,141	102,459	117,096	117,096	117,096	117,096	768,442
Payment	0	159,378	248,103	413,505	537,557	620,258	661,608	661,608	661,608	661,608	4,625,233
<b>Total O&amp;M</b>	<b>0</b>	<b>159,378</b>	<b>433,000</b>	<b>1,007,926</b>	<b>1,427,565</b>	<b>1,624,793</b>	<b>1,727,299</b>	<b>1,730,252</b>	<b>1,730,252</b>	<b>1,730,252</b>	<b>11,570,717</b>
<b>Total DFAS-CO</b>	<b>315,609</b>	<b>1,367,060</b>	<b>3,522,199</b>	<b>5,749,332</b>	<b>7,332,114</b>	<b>8,199,372</b>	<b>8,648,031</b>	<b>8,714,268</b>	<b>8,714,268</b>	<b>8,714,268</b>	<b>61,276,521</b>

## **APPENDIX D**

### **EDI INVESTMENT COSTS**

This appendix provides supporting details for the investment costs required to implement electronic data interchange (EDI) at the Defense Finance and Accounting Service – Columbus Center (DFAS-CO).

#### **DFAS-CO INVESTMENT COSTS**

Table D-1 shows DFAS-CO's EDI investment costs for each of the three mission areas: Contract Administration Services (CAS), Stock Fund, and Operations and Maintenance (O&M) payments. Although some requirements (such as hardware and software) can be shared by all three mission areas, we assign them to the CAS payments area, where one-half of the total DFAS-CO cost savings are expected to occur. We discuss our other assumptions in more detail below.

#### **Hardware**

Hardware investment costs are determined, in large part, by the configuration chosen. The private sector typically uses either a front-end or a host EDI technical configuration. In the front-end configuration, EDI translation software resides on either a minicomputer or a microcomputer. That computer passes EDI files to and from the application system software, which resides on a different computer (typically a mainframe). In the host configuration, EDI translation software resides on the same computer as the application software. We show the costs for these alternatives in Table D-2.

We assume that DFAS-CO would use the Logistics Information Exchange (LINX), residing on an American Telephone and Telegraph (AT&T) 3B2, as a front-end interface between the EDI translation software and the DFAS-CO applications systems. The Defense Logistics Agency (DLA) Systems Automation Center (DSAC) estimates that a fully loaded AT&T 3B2, with sufficient optical disk storage to accommodate DFAS-CO's needs, would cost approximately \$75,000 (\$30,000 for the 3B2 and \$45,000 for the extra disk storage). DFAS-CO should require only one

**TABLE D-1**  
**DFAS-CO INVESTMENT COSTS**  
**(\$000)**

Requirement	CAS	Stock Fund	O&M	Total
Hardware	75	a	a	75
Software	15	a	a	15
Telecommunications	3	a	a	3
System integration				
• Interface programming	42	42	42	126 <sup>b</sup>
• Application systems enhancements	455	455	455	1,365
Program management				
• Promote and coordinate	28	28	28	84
• Internal operating procedures	18	18	18	54
• Trading partner development	28	28	28	84
Implementation support				
• Planning and coordination	25	25	25	75
• Standards development	75	a	a	75
• Implementation guidelines	75	a	a	75
• Training	4	4	4	12
• Trading partner expansion	25	25	25	75
<b>Total</b>	<b>868</b>	<b>625</b>	<b>625</b>	<b>2,118</b>

<sup>a</sup> Not required if CAS payments is DFAS-CO's top priority for EDI.

<sup>b</sup> Already funded under LINX.

minicomputer (in the near term) for all three mission areas. We assign all hardware costs to the CAS payments area.

### Software

We assume that DFAS-CO would use American Business Corporation (ABC) translation software, which it has already tested on the AT&T 3B2 minicomputer, at a cost of \$15,000. Again, since only one software package is required, we assign its costs to the CAS payments area. DFAS-CO will require a software maintenance contract for this software at a cost of \$4,000 per year. As discussed in Chapter 5, we

TABLE D-2

## ALTERNATIVE DFAS-CO HARDWARE/SOFTWARE CONFIGURATIONS

Alternative	Cost category			Total (\$)	Comments/notes
	Hardware (\$)	Trans. software (\$)	Coml. software		
Front-end microcomputer	5,000	5,000	LINX	10,000	Hardware – 386 microcomputer, modem, printer, cables
Front-end minicomputer	30,000	20,000	LINX	50,000	Hardware – AT&T 3B2, modem, cables, printer
Mainframe	—	15,000	LINX	15,000	Existing hardware

*Note:* Trans. = translation; coml. = commercial.

treat software maintenance costs as a recurring operating expense, not as an investment cost.

### Telecommunications

The DFAS-CO would incur one-time telecommunications costs of approximately \$3,000, principally for the installation of a dedicated line between the EDI host and the commercial value-added network (VAN). Since this investment is required only once, we assign it to CAS payments.

### System Integration

The DFAS-CO will need to invest in two categories of systems integration.<sup>1</sup>

#### *Interface Programming*

As noted in Chapter 5, we assume that LINX would provide the interface to DFAS-CO's applications systems at a cost of \$126,000 (5½ GS-12 Systems Analysts for 6 months).

<sup>1</sup>Systems integration manpower estimates are based upon a fully burdened rate of \$45,500 (\$22.75/hour) for a GS-12 (General Schedule) Systems Analyst.



### ***Applications Systems Enhancements***

We estimate that DSAC would require approximately \$1.4 million (60,000 man-hours) to enhance all three applications systems [Mechanization of Contract Administration Services (MOCAS), Standard Automated Material Management System (SAMMS), and the future O&M system]. Those enhancements could range from relatively minor modifications to accommodate EDI, to major improvements such as adding a prepayment auditing capability or changing late payment and discount calculations. The magnitude and costs of these enhancements will be determined more accurately following development of functional specifications for each system.

With this cost estimate, we assume that changes would be made to the existing applications systems only. The estimate could increase significantly if any of three DFAS-CO systems requires a major overhaul. Although enhancement costs may not be equal among the three systems (for example, SAMMS enhancements should cost less because of previous EDI efforts), we assign \$455,000 (20,000 hours or 10 man-years of effort) to each.

### **Program Management**

The DFAS-CO should assign two full-time GS-12 Program Analysts, for approximately 2½ years, to promote and coordinate the program, develop internal operating procedures, and establish trading partner relationships. (Chapter 6 describes the responsibilities of those analysts in more detail.) We allocate the cost for those activities (approximately \$222,000) equally among the three mission areas.

### **Implementation Support**

The DFAS-CO could accelerate accomplishment of the following tasks by using contractors experienced in implementing EDI.<sup>2</sup>

#### ***Planning and Coordination***

We assume that all three mission areas combined would require 1,000 hours of contractor support for planning and support activities in the early stages of

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<sup>2</sup>We use a fully burdened contractor rate of \$75.00 per hour for all implementation support calculations.

implementation. The total cost for that support (\$75,000) is split evenly among the three mission areas.

### ***Standards Development***

We assume that DFAS-CO would need to enhance existing American National Standards Institute (ANSI) transactions to meet its requirements. To do so, DFAS-CO representatives would need to participate in ANSI X12 subcommittee meetings at a rate of about 1 man-month (166 hours) per transaction set. We estimate that five ANSI transaction sets (810, 850, 856, 860, and 861) would require modification, and possibly a fifth (820), for a total commitment of 26 weeks or \$75,000 in contractor support. We assign those costs to the CAS payments area since it is likely to be implemented first.

### ***Implementation Guidelines Development***

We also assume that DFAS-CO would need contractor support to develop implementation guidelines for the six documents or transactions: SF (Standard Form) 26, DD (Defense Department) Form 1155, SF 30, invoice, destination acceptance, and payment status. Each guideline should require approximately 1 man-month of effort, for a total contractor cost of approximately \$75,000. Again, we attribute the entire cost of this requirement to the CAS mission area because it should be implemented first, with the other mission areas using the same implementation guidelines.

### ***Training***

We estimate that DFAS-CO would need to train four people from each mission area (functional, technical, and communications experts) on basic EDI concepts, operating procedures, and software operation. A variety of commercial training firms and software vendors offer EDI training courses, typically charging \$1,000 per attendee.

### ***Trading Partner Expansion***

The establishment of trading partner relationships is critical to a successful EDI program, especially in its first year of operation. We assume that DFAS-CO would require contractor assistance to develop a trading partner implementation strategy and information package. We estimate that this contractor support would

cost approximately \$75,000 (1,000 contractor hours), split evenly among the three mission areas.

### Annual Telecommunications Costs

Although not listed as an investment cost, DFAS-CO and Information Processing Center – Columbus (IPCC) would need to annually set aside funds for telecommunications operating costs. Table D-3 shows our estimates of those costs over the life cycle of the project. In this table, we assume an average telecommunications transaction cost of approximately \$0.05 per document (\$0.02 in FY92 when less expensive payment transactions predominate), and annual implementation rates consistent with those presented in Chapter 5 and Appendix C. We estimate that DFAS-CO's annual telecommunications costs would range from \$1,658 in FY92 to approximately \$473,000 in FY99.

**TABLE D-3**  
**ANNUAL DFAS-CO TELECOMMUNICATIONS COSTS**

Category	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	Total
Document volumes	8,292,952	10,452,852	12,612,753	12,612,753	12,612,753	12,612,753	12,612,753	12,612,753	12,612,753	12,612,753	119,647,828
Average telecommunication cost per document	\$0.02	\$0.05	\$0.05	\$0.05	\$0.05	\$0.05	\$0.05	\$0.05	\$0.05	\$0.05	—
Average implementation rate	1%	5%	15%	30%	45%	55%	65%	75%	75%	75%	—
Total telecommunications cost	\$1,658	\$26,132	\$94,596	\$189,191	\$283,787	\$346,851	\$409,714	\$472,978	\$472,978	\$472,978	\$2,771,063

If DFAS-CO did not implement EDI, we estimate that its annual mailing costs would exceed \$768,000 in current dollars by FY98, assuming 2,650,250 payments in FY98 at \$0.29 per payment. This estimate does not include the postage costs for incoming documents such as contracts, invoices, and destination acceptance.

### DoD INVESTMENT COSTS

Table D-4 shows a breakout of Department of Defense's (DoD's) investment costs by CAS and O&M payments. Since Stock Fund contracts and destination acceptance notices are not included in our implementation plan — they are already

sent electronically through the Active Contracts File – the Stock Fund area does not require any additional investment.

**TABLE D-4**  
**DoD INVESTMENT COSTS**  
**(\$000)**

Requirement	CAS payments			O&M payments			DoD
	Procurement activities (31)	Unique systems (8)	Subtotal	Procurement activities (15)	Unique systems (3)	Subtotal	Total
<b>Hardware</b>	930		930	450		450	1,380
<b>Software</b>	465		465	225		225	690
<b>Telecommunications</b>	93		93	45		45	138
<b>System integration</b>							
Interface programming		336	336		126	126	462
Applications systems enhancements		1,824	1,824		684	684	2,508
<b>Program management</b>							
Promote/coordinate		216	216		81	81	297
Internal operation procedures	558		558	54		54	612
<b>Implementation support</b>							
Planning/coordination		200	200		75	75	275
Training	124		124	60		60	184
<b>Total</b>	2,170	2,576	4,746	834	741	1,800	6,546

The investment requirements for the DoD trading partners are similar to those for DFAS-CO. However, the large number of procurement activities (31 for CAS and 15 for O&M) dramatically increases DoD's investment requirements in several areas (hardware, software, internal operating procedures, and training). Some requirements – such as interface programming, applications systems enhancements, promotion, and planning – may be consolidated at the Central Design Agencies, resulting in significant cost efficiencies. As Table D-5 shows, the 31 CAS procurement activities currently support an estimated 17 unique systems, and the 15 O&M activities support 4 unique systems. However, the number of unique systems should continue to decline as additional systems are consolidated as a result of DoD's Corporate Information Management (CIM) efforts. We believe that the number of

unique systems in the CAS payments area should eventually decline to four, with the number of unique O&M systems declining to two.

Nevertheless, for costing purposes, we assume the existence of 31 procurement activities and 8 unique systems in the CAS payments area, and 15 procurement activities and 3 unique systems in the O&M area.<sup>3</sup> We also assume that some DoD activities will not require certain activities (such as trading partner development and expansion, standards development, and implementation guidelines) because once completed for DFAS-CO, they need not be repeated.<sup>4</sup>

- *Hardware.* \$30,000 per procurement activity for a fully loaded AT&T 3B2. (DFAS-CO's AT&T 3B2 costs an estimated \$75,000, which includes \$45,000 for extra optical disk storage required by DFAS-CO document archiving procedures. We assume that DoD procurement activities would not require this additional feature.)
- *Software.* Each procurement activity would require a translation software package at \$15,000 per activity.
- *Telecommunications.* We estimate that one-time telecommunications installation costs would total \$3,000 per procurement activity. These costs include miscellaneous hardware and software requirements (such as modems, telephone lines, cables, etc.), which enable an activity to communicate with the VAN.
- *System Integration*
  - ▶ *Interface Programming* – \$42,000 (approximately 1,850 hours) per unique system, which is consistent with LINX estimates.
  - ▶ *Applications Systems Enhancements* – \$227,500 (10,000 hours) per unique system. Because some systems may require little or no enhancements, we use one-half of the DFAS-CO estimate of 20,000 hours per unique system.
- *Program Management*
  - ▶ *Promote and Coordinate* – \$27,000 (approximately 1,200 hours) per unique system, the same as the DFAS-CO estimate.

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<sup>3</sup>We use a higher number of unique systems than anticipated under the CIM efforts because some of the CIM consolidations are likely to occur after DFAS-CO implements its EDI program.

<sup>4</sup>We calculate all cost estimates, with the exception of the planning and coordination and training activities under implementation support, using a fully burdened GS-12 rate (\$22.75/hour). The planning and coordination cost estimate uses a \$75.00/hour contractor rate; for training, we use \$4,000 per procurement activity (4 persons per activity at \$1,000 per person).

## AUTOMATED PROCUREMENT SYSTEMS BY MILITARY SERVICE/DEFENSE AGENCY

**Note:** SPEDE = SAMMS Procurement by Electronic Data Exchange; UICP = Uniform Inventory Control Program; APADE = Automation of Procurement and Accounting Data Entry; CONDRAIS = Contract Directorate Automated Information System; NADMIS = Research and Development Management Information System; CRP = Contract Research Program; CDMIS = Contract Directorate Management Information System; FARA = Federal Acquisition Regulations Automated; PRISM = Purchase Request Information System; ACPS = Automated Contract Preparation System; DPCI = Distributed Processing for Contractual Input; PACAF = Pacific Air Forces; R&D = research and development; BCAS = Base Contracting Automated System; AMIS = Acquisition Management Information System; ADIS = Acquisition and Due-In System; CCSS = Commodity Command Standard System; PADDIS = Procurement Automated Data and Document System.

- ▶ *Internal Operating Procedures* – \$18,000 (approximately 800 hours) per procurement activity (same as DFAS-CO).
- *Implementation Support*
  - ▶ *Planning and Coordination* – \$25,000 (approximately 333 contractor hours) per unique system (same as DFAS-CO).
  - ▶ *Training* – \$4,000 per procurement activity (same as DFAS-CO).

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13. ABSTRACT (Maximum 200 words)

The Defense Finance and Accounting Service - Columbus Center (DFAS-CO), one of six major Department of Defense (DoD) finance centers, will process more than 12 million paper documents (contracts, invoices, payments, status requests, and acceptance reports) per year by 1994. This volume and several other favorable characteristics (stable trading partner relationships, sufficient internal automation, and few business obstacles) make DFAS-CO a ripe environment for Electronic Commerce.

We identify several applications of electronic data interchange (EDI) that will enable DFAS-CO to reduce the direct cost of its operations by more than \$61 million over the next 10 years. The cost to DFAS-CO of implementing an electronic-based operating environment is projected at approximately \$2.1 million; DoD activities that conduct business with DFAS-CO would need to invest an additional \$6.6 million.

To guide DFAS-CO EDI efforts, we provide detailed operating concepts and implementation schedules for each major opportunity area, along with a single technical configuration that uses gateway software and a commercial value-added network. Implementing those operating concepts will allow DFAS-CO to satisfy current and future payment responsibilities with minimum personnel growth.

14. SUBJECT TERMS

Electronic Commerce; electronic data interchange (EDI); Contract; Invoice; Payment; Destination Acceptance; Cost Savings; Contract Administration Services (CAS); Stock Fund; Operations and Maintenance (O&M); Implementation Plan; Commissary Payments; DFAS; APCAPS; SPEDE; MOCAS; SRD-1; ANSI; VAN; LINX

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